AVIATION WEEK

McGRAW-HILL PUBLICATION

DEC. 24, 1951

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ENGINE: Westinghouse J-34 Jet

METERING SYSTEM: Holley Turbine Control

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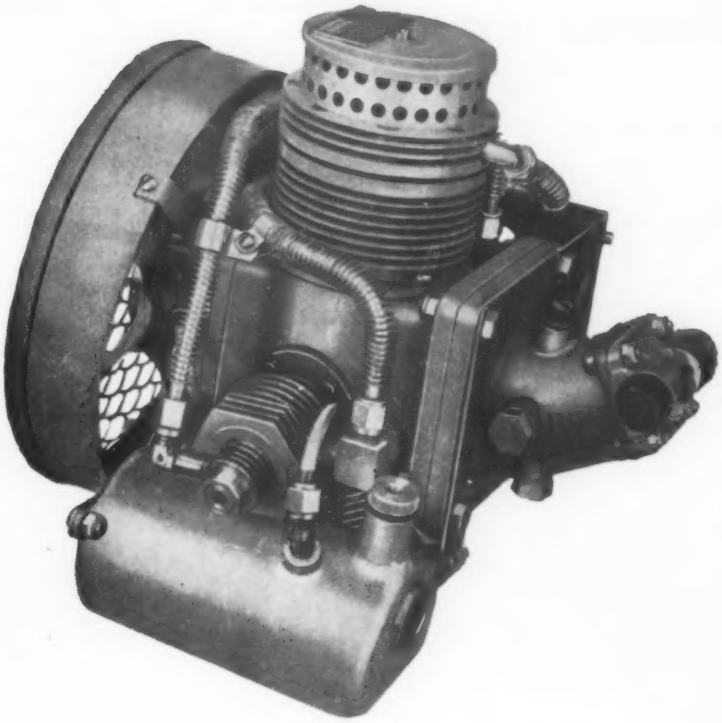

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Aviation Week

ABP Member ABC

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When 55 M.P.H. *was Fast!*

At the first Air Meet at Los Angeles, Glenn Curtiss won the speed race. At this same meet Curtiss established a new speed record of fifty-five miles per hour, "carrying a passenger."

The Sabre-Jet is one of the AF's front line fighters. Powered with a GE turbo jet, the Sabre has a tactical radius of 500 miles and its speed is well up in the "over-600-mph" class.

The baby science, aviation, was just stretching its wings in 1910. And if a "record speed of 55 mph" seems incredibly slow today, it is because of the tremendous progress aviation has made in the last 40 years! Improvements in design, size, speed, and endurance of planes have been matched by equally important, but less obvious, developments in aviation fuels.

Phillips research chemists have contributed substantially to the development of modern aviation fuels . . . high-octane gasolines, turboprop and jet fuels. Growing up with the aviation industry, Phillips Petroleum Company is today one of the largest suppliers of dependable aviation products for private, commercial and military planes.

Aviation Division, Phillips Petroleum Company, Bartlesville, Okla.

Phillips 66

AVIATION PRODUCTS

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FINISHED PARTS are checked right on the assembly floor with plug gage standard pictured at left. Tolerances as close as 0.0001 in. are maintained.

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607-25

NEWS DIGEST

DOMESTIC

PAA strike of about 5,000 ground and flight service personnel (Transport Workers Union) ended Dec. 19 as suddenly as it had begun three days before. President Truman invoked Railway Labor Act and appointed an emergency fact-finding board. Union members voted to return to work pending board report. At issue: wages. Union asked 18 cents an hour; PAA's last offer before strike was 10 cents. Airline claims it maintained 92% of normal operations during strike and, because of greater traffic this year, carried more passengers and mail than during same period a year ago.

National Air Council is suspending operations. The December National Air Review, produced in smaller-than-usual pocket-size format, is expected to be the last issue of the council's magazine. Charles D. Frazer, executive vice-president and editor of the magazine, will probably go into private business in Washington. The organization is expected to keep its corporate entity, with the possibility of resuming activity at some later date.

Charles O. Cary, executive secretary of the Air Coordinating Committee, has been appointed deputy administrator of the Defense Air Transportation Administration, U. S. Department of Commerce. DATA, headed by Paul Butler, carries out the air transportation mobilization program.

Rear Adm. Laurence B. Richardson, director of research and development for Fairchild Engine and Airplane Corp., resigned last week to become senior vice president of the Electric Boat Co., Groton, Conn. Electric Boat Co. owns Canadair, Ltd., the largest Canadian aircraft manufacturer.

Civil aircraft shipments during September came to 184 planes worth $5.5 million, and unfilled orders for planes of 3,000-lb. airframe weight and over came to 675. During the month 460 engines were shipped, valued at $2.4 million. Plane plant employment was 321,804 and engine plants had 74,154 persons.

Interline traffic business transacted through the Airline Clearing House during October came to $27,752,196, a 35% increase over the same period last year.

Double indemnity provisions, formerly covering those flying only in scheduled airliners, are being applied to passengers flying in any commercial aircraft, including nonskeds and business executive planes, under broader coverage applied to policies that are issued by Mutual Life Insurance Co. of N. Y.

FINANCIAL

Capital Airlines reports a $245,110 net profit after taxes for October, with net profit for ten months ending Oct. 31 being $1,693,362.

Trans Caribbean Airways has declared a five-cent-per-share dividend on Class A stock payable Jan. 15 to holders of record Dec. 31.

Northwest Airlines has declared a 28¾-cents quarterly dividend on the carrier's 4.6% cumulative preference stock, payable Feb. 1 to holders of record Jan. 18.

Philippine Air Lines showed a net profit of $75,404 for October, and the carrier had a $59,392 surplus at Oct. 31.

Aeroquip Corp., Jackson, Mich., reports record sales of $14,723,067 for the fiscal year ended Sept. 30, a figure which will more than double last year's. Net profit after taxes for the current period was $824,914. Unfilled orders now are over $13 million and production is at annual rate of more than $20 million.

INTERNATIONAL

Eric Warlow-Davies has been named general manager of Rolls-Royce Ltd., Montreal and David Boyd has been made production manager at the plant. The company has orders for 900 Nene jet engines.

Qantas Empire Airways has been given approval by the Australian government to spend dollars for purchase of two more Lockheed Super Connies, making a total of three ordered by the carrier.

Dispute between Trans-Canada Air Lines and Canadian Air Line Pilots Assn. concerning seating of passengers on DC-4M flight deck is now being negotiated. Eight TCA pilots who were suspended early this month for refusing to take passengers seated in this location have been reinstated to their regular assignments.

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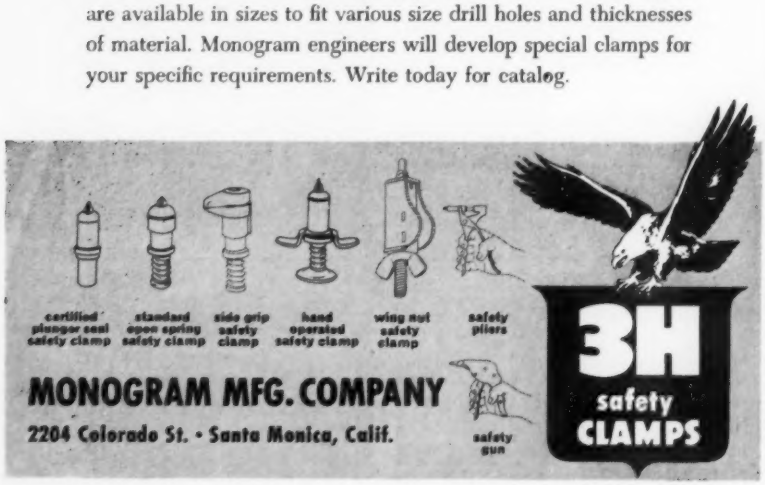


MONOGRAM MFG. COMPANY

2204 Colorado St. • Santa Monica, Calif.

AVIATION CALENDAR

Jan. 5-6, 1952—Annual Miami Air Show, sponsored by the Florida Pilots Assn., Opa Locka Airport, Florida.

Jan. 6-8—Annual Cessna Distributors Meeting, Allis Hotel, Wichita, Kansas.

Jan. 8-10—Upper Midwest Armed Forces Procurement Exhibit showing small businessmen subcontracting possibilities, National Guard Armory, Minneapolis.

Jan. 14-18—Annual meeting of Society of Automotive Engineers; included among the papers will be several on aircraft and aviation; Hotel Book-Cadillac, Detroit.

Jan. 22—Meeting of Institute of the Aeronautical Sciences, Cleveland-Akron Section; talk, "Freight by Air," by T. L. Grace, president of Slick Airways; Cleveland.

Jan. 28-Feb. 1—20th Annual Meeting, the Institute of the Aeronautical Sciences, Astor Hotel, New York.

Jan. 29-31—114th National Meeting of the American Meteorological Society, Roosevelt Hotel, New York.

Feb. 7—Meeting of Society of Automotive Engineers, Igor I. Sikorsky will speak on helicopter programs. Brass Rail Restaurant, 5 Ave. near 43 St., New York.

Feb. 7-8—Regional meeting of Instrument Society of America, Power Plant Symposium, Hotel Statler, New York.

Mar. 3-6—Institute of Radio Engineers, Waldorf-Astoria Hotel & Grand Central Palace, New York.

Mar. 3-7—Spring meeting of American Society for Testing Materials; symposium on testing metal powders and metal powder products; Hotel Statler, Cleveland.

Mar. 17-19—Second Midwestern Conference on Fluid Mechanics, to be held at Ohio State University.

Mar. 17-22—American Society of Tool Engineers, International Amphitheater, Chicago, Ill.

Mar. 21—National Flight Propulsion Meeting, Institute of the Aeronautical Sciences, Cleveland.

Mar. 30-Apr. 3—Convention of American Association of Airport Executives, Ft. Worth.

April 21-24—National Aeronautic Meeting and Aircraft Engineering Display, Society of Automotive Engineers, Hotel Statler, New York.

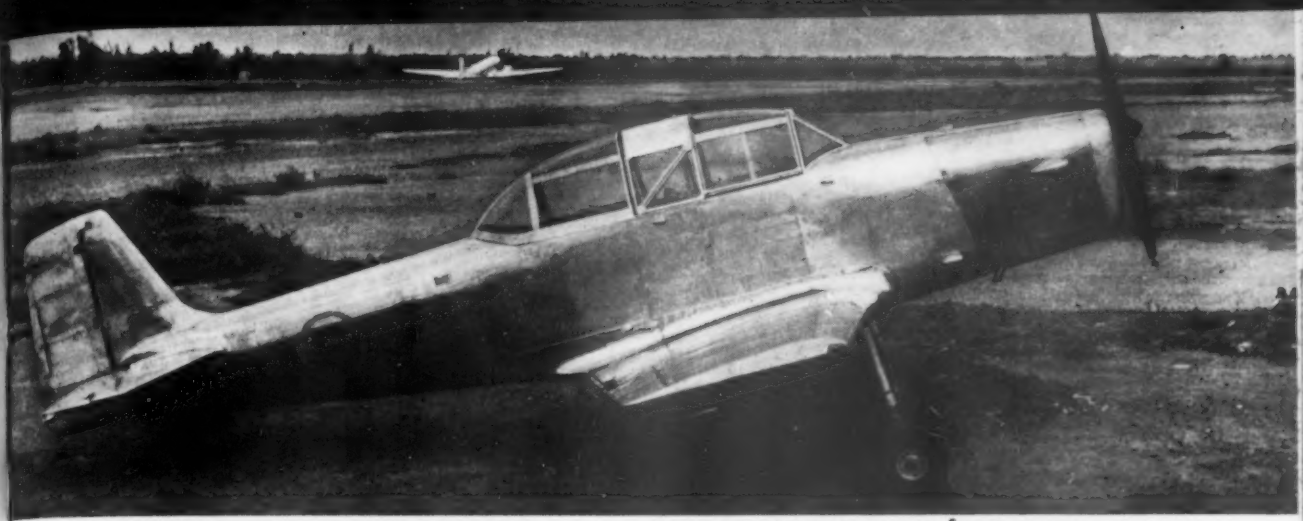
May 8-9—Fifth annual Wisconsin Aeronautics Conference, Green Bay.

June 9-21—Triennial meeting of International Organization for Standardization; host will be American Standards Assn.; Columbia University, New York.

June 23-27—American Society for Testing Materials' 50th Anniversary Meeting, Statler and New Yorker Hotels, New York.

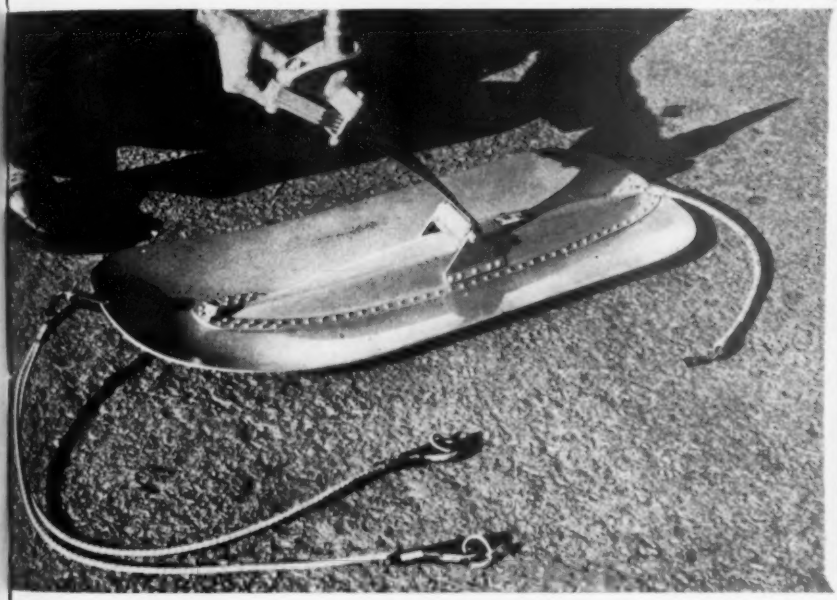
PICTURE CREDITS

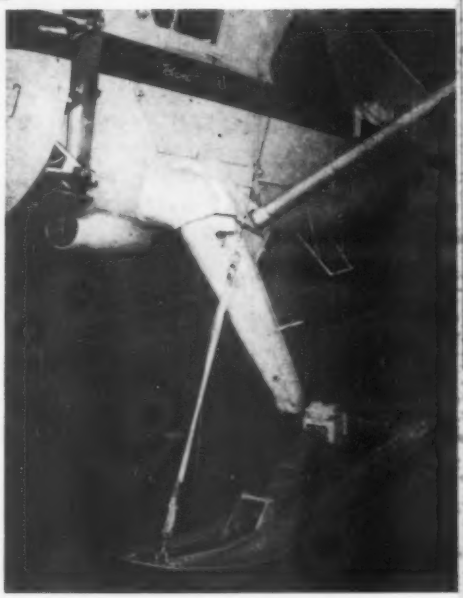
9—(top) Hindustan Aircraft, Ltd.; (center, two) Levy-Shipp; (bottom, left) McGraw-Hill World News; 16—(right) Defense Dept.; 17—Boeing; 26—Ryan Aeronautical Co.



MADE IN INDIA—H.T. 2 is a basic trainer designed, built and recently test flown by Hindustan Aircraft Ltd., Bangalore. Production version will have a 155-hp. Blackburn Cirrus III giving the plane a speed of 145 mph. and climb of 900 fpm. at sea level.

New Aircraft and Equipment

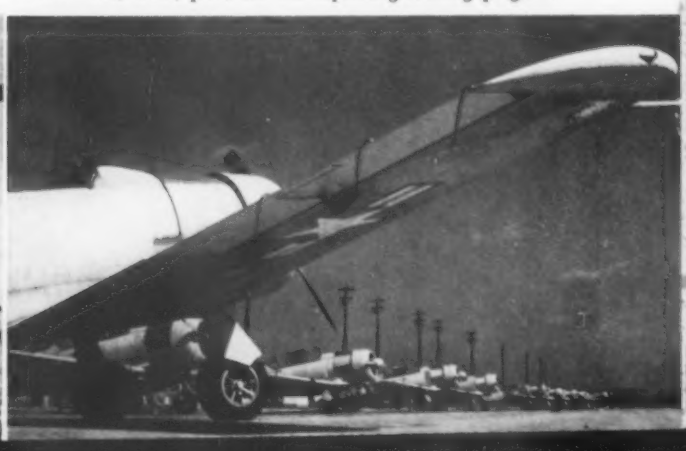




SKIS FOR BEAVER—Above are pictured two of several different ski gears developed by de Havilland-Canada for their Beaver light freighter. Both shown here use leaf spring shock absorbers. At left is tail ski, main gear installation is at right.

BRISTOL AMBULANCE—Bristol 171 Sycamore Mk. 10 four-five place copter for RAF can carry two stretchers internally. Normal level speed is 133 mph. at 5,000 ft.

BACK IN SERVICE—Lineup shows some of the many refurbished North American T-6Gs being turned out at NAA's Columbus, Ohio, plant for our expanding training program.



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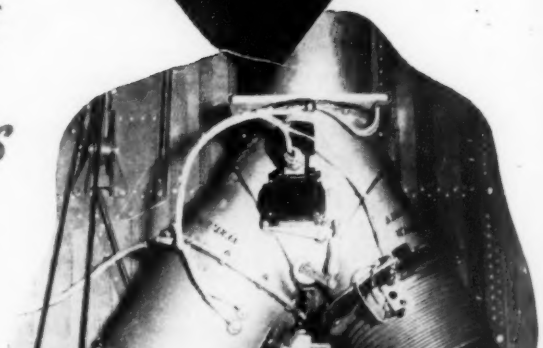

Whenever liquids and gases must be conveyed under conditions of vibration, misalignment, flexation or expansion and contraction, CMH REX-FLEX solves the problem. Fabricated from stainless steel, in a variety of forms, CMH REX-FLEX combines flexibility with the durability and temperature resistance of stainless steel. It is fabricated in a variety of forms and assemblies to meet the most exacting application requirements. Scientifically determined curvature of corrugations provides maximum resistance to fatigue to assure long, dependable life.

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WHO'S WHERE

In the Front Office

E. J. Odlum, former contract administrator for Kaman Aircraft Corp., Windsor Locks, Conn., has been appointed vice president-contracts for the copter firm. He joined the company as chief of military sales. In other Kaman moves, **J. M. Walsh,** treasurer-assistant secretary, has been named a director while retaining his other duties. **H. J. MacDonald** has been promoted to assistant works manager and **E. G. Conway** to production manager.

E. T. Bolton has taken over new duties as vice president-advisor for Philippine Air Lines at the company's U. S. headquarters in San Francisco. Until recently administrative vice president of PAL in Manila, Bolton continues as a director.

Franklin D. Walker has been designated vice president of Jefferson, Lyons & Co., public relations counsel in Newark, N. J. Walker has edited house organs for Curtiss-Wright and Fairchild Engine & Airplane Corp., and was managing editor of Flying magazine prior to his new post.

Changes

Rear Adm. T. A. Solberg, USN (Ret.), has been appointed general consultant for Arma Corp., Brooklyn, N. Y., makers of electronic and mechanical equipment.

James V. Ryan, former chief test pilot with Piasecki Helicopter Corp., has joined Gyrodyne Co. of America, Inc., L. I., N. Y. in the same capacity.

Carl J. Tsaloff has been designated production manager of B. F. Goodrich aeronautical division.

William H. Baines, at one time with Curtiss-Wright in Buffalo and Louisville, has been appointed factory superintendent of Stanley Aviation Corp., Buffalo, N. Y.

Orian Reasor has joined Prewitt Aircraft Co., Clifton Heights, Pa., as chief inspector.

Eugene Roessner has been placed in charge of U. S. Airlines' new freight depot at N. Y. International Airport.

H. C. Cotterell has been designated manager of purchasing and stores for Trans-Canada Air Lines under a new arrangement whereby TCA assumes all responsibility for airline purchasing functions formerly held by Canadian National Railways.

Walter H. Zeiser has been named agency and interline sales manager for Pacific Northern Airlines. He was with United States Lines until 1941 when he joined Pan American. Since 1949 he was travel consultant with Universal Travel Directors.

Honors and Elections

Capt. Charles F. Blair, PAA pilot who flew solo across the North Pole from Bardufoss, Norway to Fairbanks, Alaska in an F-51 last May, has been awarded the Norwegian Aero Club's Gold Medal for 1951.

INDUSTRY OBSERVER

► Latest move in the new design round of putting sweep-back wings on heretofore straight-wing jet fighters concerns the Douglas F3D Navy night fighter. It is scheduled to get new and more powerful engines soon, probably Westinghouse J-46s, and will get some sweep-back in its wings and tail at the same time. The sweptwing Skyknight will be designated F3D-3.

► A switch of engines in Chance Vought's F7U-3 Cutlass, Navy jet fighter, is just a temporary expedient—until Westinghouse can make delivery on the J-46 engines slated for the airplane. While awaiting the J-46s, Chance Vought is flying Allison J-35s in a few Cutlasses now coming out, in order to get additional experience on the unusual configuration. But as soon as the J-46s come along, according to current plans, they will be installed in the planes now flying with J-35s, as well as becoming original equipment in later F7U-3s. Earlier Cutlass models have been powered by J-34 engines, but the 3s are to be equipped with the larger J-46s. No Allison-powered 3 is expected to get into squadron service.

► Custom of providing chase planes to fly with new planes under test has given rise to some interesting impromptu races among the hottest Air Force planes. There is one report that a Boeing B-47 six-jet bomber pulled away from its North American F-86 Sabre jet chase plane in an unofficial contest. Whether the F-86 was going all-out is not clearly established. It was a reversal of what spectators at Andrews AFB, including President Truman, saw two years ago (Feb. 15, 1949) when a prototype XB-47 and an F-86A sprinted across the field. The F-86A obviously pulled away from the speedy bomber.

► Modification program on 124 North American B-25 Mitchell bombers of World War II to convert them into bomber trainers, designated TB-25L, is being started at modification center at Birmingham, Ala. Changes will include larger entrance and escape hatches, improved seating with new instructor's seat between pilot and co-pilot, and modern navigational aids. Planes will be assigned to Reese AFB and Vance AFB.

► Problem in development of forge press production methods for the aircraft industry is getting more precise forgings, closer to required finished dimensions and eliminating extensive machining. Approximately 50% of the material in the 342 small light alloy forgings now used in the Northrop F-89 is being machined off after the forgings are received.

► Besides common industry problems, Fairchild Engine & Airplane Corp. is up against a special insurance problem at the wooden government-owned aircraft plant which it is occupying at O'Hare Airport, Chicago. A number of structural changes, including installing some firewalls and roof work, will have to be made, Chicago sources say, before the firm will be able to get adequate insurance. Plant already is filled with a maze of overhead sprinkler systems.

► As far as is known, USAF has no production plans yet for its first delta-wing research plane, the Convair XF-92A. Navy's delta-wing research centers around the "almost delta-wing" Douglas F4D, probably the hottest jet in the Navy fighter stable, and some discussion about a water-based fighter patterned, at least partly, after the Convair XF-92A.

► While the 75,000-ton forge press, which had been scheduled to be built for Wyman Gordon operation, has been shelved to free manufacturing capacity for more medium size forge presses, it is not regarded as a top limit by any means. At the recent forge press industry conference on the West Coast there was serious discussion of some huge forgings which might require a press of 150,000 tons or even larger.

► Allison division, General Motors, is making its own modifications on the B-45 North American jet bomber, which has been loaned to it by the Air Force, for a flying test bed for its J-71 engine. The modifications, however, are very similar to those which were made previously by North American to provide a flying test bed arrangement for General Electric, and were made with the guidance of North American's engineering drawings on the GE test bed B-45.

Washington Roundup

Guns and/or Butter

As long as U. S. is technically "at peace," it is going to be a case of "butter," with as much "guns" as possible. That's the stand of the Administration and a majority of the Congress.

They do not want an "undue peaking" of aircraft and other military end-item production—not until the industrial basics, such as electric power, aluminum, other metals, have been expanded so that the "peaking" won't hurt the "butter" economy too much.

On the other side of the fence are the military and Sen. Lyndon Johnson's influential Preparedness Committee. They emphatically want aircraft and other military output "peaked"—even if it severely hurts the civilian economy—for a quick build-up to an effective striking force in-being soon, not later.

Sen. Burnet Maybank's equally influential Joint Defense Production Committee, which sees eye to eye with Defense Mobilizer Charles Wilson, promptly fired back at the Johnson Committee's scathing attack on the mobilization program for lagging production—notably lagging aircraft production.

But expect a retort and another demand for more guns and less butter from the Johnson Committee soon.

Points made by the Maybank group:

• "The position was determined and substantiated . . . in the mobilization policy that efforts would be made to avoid undue peaking of the military production in order to provide productive capacity and production potential as well as stocks of military end items."

• "The plan of permitting manufacturers, including those who make non-essential civilian goods requiring copper and aluminum, to operate at low levels rather than to put them out of business by prohibiting the use of basic materials entirely in less essential products, is a wise one under the circumstances. If total war is averted, these manufacturers will contribute to the national economy and to our policy of free competitive enterprise. . . ."

• "With the tremendous new vistas opened daily in the improvement of supersonic aircraft, the most advanced design today may be outmoded tomorrow or next week. . . . To produce large numbers of any given model would be wasteful and disastrous. . . . It might give the nation a very false sense of security."

• "Charles Wilson . . . and Manly Fleischmann, Administrator of Defense Production Administration, have done an outstanding job of defense mobilization."

Navy League on the Go

Navy League, with a spur from Navy's new Secretary Dan Kimball, is on the go to sell a bigger and better "global air Navy" to the nation.

Kimball's kick-off pep-talk to the League:

"It seems to me that this organization could be built up to great strength through broad expansion of its membership. . . . I visualize a scheme whereby large corporations or business firms would pay substantially larger dues than individual members.

"By directive of the Secretary of the Navy on Feb. 6, 1950, the Navy Department clearly enunciated a policy of close cooperation with the League. This policy was reinforced by a letter . . . on Aug. 2, 1951.

"That is the Navy's position today, and I am sure that this close partnership will continue. It could be helped considerably by expanding your membership among the more than 3,000,000 men and women who served with the Navy during the last war. . . .

"Navy League's role, of course, is not to make Navy policy. It is, rather, to expound and interpret it—or to criticize it if your conscience so dictates. However, I do not believe this criticism ought ever to be at the expense of—or to the disparagement of—the Navy's sister services. . . .

"If war is to be kept from our shores, it must be done through our ability to fight wars on other continents.

"The Navy is still the major force that can carry and project our armed power to all parts of the world. . . ."

"Personal Trouble Shooter"

The Johnson Committee's call for a procurement czar to spur military production has been half-answered by defense Secretary Robert Lovett:

He has appointed W. D. Pawley as his "personal trouble shooter" to break the bottlenecks. Pawley served as president of China National Aviation Corp. before the war. As president of Inter-Continent Corp., he built five aircraft factories—three in China, one in India, and one in Miami. Since the war he's served as ambassador to Peru, later to Brazil.

Strategy Trends

• **B-36 outmoded?** With the benefit of hindsight, some members of Congress think so.

They question whether the aircraft will ever be used—even in an all-out war. They say that USAF's current program of "ringing" Russia with bases, and the development of smaller sizes of atomic bombs—capable of knocking out targets without the morally questionable mass destruction of civilians—diminishes B-36 strategic value.

• **Army's bid.** Key determinant to the composition of the military services now is which service is best suited to deliver atomic retaliation on an aggressor. Development of baby A-bombs is behind Defense Department's new emphasis on Naval aviation and medium-range and tactical USAF aviation.

But Army's Chief of Staff, Gen. J. Lawton Collins, is anticipating the experts and campaigning for a bigger Army on the grounds that atomic artillery is just around the corner and will make ground forces, strategically placed around the globe, the U. S. "first line of defense."

Aircraft Competition?

Hopelessly split on the issue of government financing of development costs for new commercial craft, aircraft manufacturers aren't taking any position.

Aircraft Industries Assn., which has been studying the issue for five years, has decided to study it some more: AIA has re-appointed a prototype committee to consider the matter.

Members: Douglas' Arthur Raymond; Boeing's Wellwood Beall; Convair's R. C. Sebold; Lockheed's Hall Hibbard; North American's C. J. Hansen; Northrop's J. W. Myers.

Some observers think companies are quietly moving forward with projects for a commercial jet transport, but hiding progress information from competitors.

—Katherine Johnsen

AVIATION WEEK VOL. 55, NO. 26
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Action Due on AF Forge Press Program

- **Airframe manufacturers have finally decided what size presses best meet needs of their new designs.**
- **Now it's up to Air Force to get the machines built, and Wright Field meeting expects to find the answer.**

By Alexander McSurely

Slowly and belatedly the crank started to turn last week to rev up the USAF's heavy forge press program for military plane production on a new high priority basis.

U. S. airframe builders had laid their cards on the table at a recent Los Angeles meeting with the Air Force and press manufacturers and operators. Most of the airplane companies agreed they can use forgings from the proposed giant 25,000, 35,000 and 50,000-ton presses in many of their forthcoming designs.

They can save millions of manhours and many tons of material that would otherwise be machined off, to say nothing of getting stronger, lighter weight airframe components, but—.

Here is how one company spokesman put it at the Los Angeles meeting:

"Northrop Aircraft design policy regarding the use of large forgings has been inhibited by delayed procurement and forging equipment size limitations."

Many Designs

Those same inhibitions are affecting many current and future aircraft designs, not only at Northrop but throughout the industry.

▶ **What to Expect**—On the other hand, here is what another company spokesman forecast on the future of aircraft production, if and when the forge press capacity now being discussed becomes available.

"Our (Lockheed's) investigations lead us to conclude that:

- "The trend in aircraft design is toward integrally-stiffened structures, large single-piece elements. The 'bits and pieces' era is fast fading.
- "Press forging can be one of the most economical cost and weight saving solutions to the manufacture of very large intricate aircraft parts."

One reason for the design inhibitions, mentioned by Northrop's T. E. Piper, is the recent case of a company whose designers were not so inhibited—Republic and the wingspar forgings for its F-84F fighter. Its forward-looking designers had planned to use single forgings as the supporting wingspars of the sweptwing F-84F. But there wasn't enough forge press capacity: So the USAF deferred Republic's F-84F production and instead gave North American Aviation orders for more F-86 fighters (AVIATION WEEK Oct. 22, p. 13).

▶ **Inadequate Planning**—Lockheed's G. W. Papen, who reported on his company's investigations, described the Republic case like this:

"The fact that Republic appears to be in trouble due to shutdown of Wyman-Gordon's Mesta (18,000 ton press) is no reflection on their judgment, but an indication of inadequate national planning. This is still a detriment which will be minimized as the new programs at Alcoa, Wyman-Gordon and Adrian go into production."

At the current writing there are three fairly large forge presses approximately ready for or in operation, all of them smaller than the smallest presses called for in new USAF development.

Largest operating is the Wyman-Gordon Company's 18,000-ton Mesta press at North Grafton, Mass., built in 1944 by U. S. funds. The other two are 15,000-ton presses, one at the Cleveland Alcoa plant, and the other at the Adrian, Mich., USAF manufacturing methods plant.

The conference was to discuss its findings late last week with Air Force Undersecretary Roswell L. Gilpatric, who was stopping at Dayton for this purpose on his way back to Washington from a West Coast trip.

Results of a recent questionnaire circulated throughout the aircraft industry on its requirements for heavy forge press and extrusion press time are being tabulated by Air Materiel Command at Wright-Patterson AFB where a conference is trying to come up with the answers to two tough questions:

How Many Presses?

Some observers forecast that if anywhere near the amount of requirements submitted by the aircraft industry is to be met, a forge press capacity may be provided beyond that called for in the old USAF $210-million program, now under re-evaluation. This is assuming the additional presses can be put into operation before it becomes necessary to freeze designs not utilizing large forged components.

▶ **50,000-Ton Maximum**—A decision to shelve the largest press previously planned—75,000 tons—is based primarily on urgency of getting more presses into operation. It was contended that additional smaller presses could be built, capacity of which would be more immediately useful.

As a result of this decision, it looks as if the 50,000-ton presses will be the maximum size in this country, in the immediate future.

Conferees at Wright-Patterson in-

Wolfe on Forgings

● **Why the U. S. aircraft industry needs forge presses has been succinctly stated by Lt. Gen. K. B. Wolfe (Ret.) who, when he was Air Force director of materiel, gave the first push to the large press program in the face of indifference on the part of fellow officers and a segment of the industry: Parts not requiring full pressure of the presses can be produced in multiple cavity dies, producing large quantities of forgings rapidly . . . Several dies for different parts can be placed in the press simultaneously and the parts produced at one time . . . Greater strength can be obtained in parts of lighter weight . . . Manhours are reduced due to less time for machining and fewer components to assemble . . . Critical materials demand is reduced. With forgings to relatively close tolerances which can be machined, instead of parts being "hogged" out of slab stock . . . Fewer machine tools, and less floor space will be required, freeing critical machine tool capacity and plane space for other use.**

clude AMC manufacturing methods experts and representatives of press manufacturers and of companies which will operate the presses.

Poll of the aircraft industry, which supplied the requirements, was based on the following factors as reported by each aircraft manufacturer:

- Number of large light metal alloy forgings weighing over 40 lb. or over 30 in. long required.
- Number of large light metal alloy extrusions needed, including parts over 10 sq. in. in cross section area, or 10 in. diameter, or weighing over 100 lb.
- Unusual or large size steel forgings requiring work on relatively large presses; also all steel extrusions.

With the entire U.S. machine tool industry already having a priority on expansion, second only to the Atomic Energy Commission's as far as materials are concerned, the question of giving the forge press manufacturers some super-priority within this general class is yet to be decided.

Other Questions

What facilities, what equipment and what manpower could be cleared for the forge press program and at the expense of what other programs?

The story of what happened in this country since 1944, when the Wyman-Gordon press was built, and the present is a story of a few forge press advocates who persisted in trying to sell this manufacturing technique for aircraft, against a discouraging apathy in Air Force, Munitions Board and in industry circles.

► **Needs Foreseen**—Lt. Gen. K. B. Wolfe, as director of Air Force procurement and industrial planning, early saw the mass production possibilities of the forge press techniques and pushed for the establishment of the Adrian plant, where captured German presses of 15,000 tons, 7,000 tons, 2,000 tons and 600 tons were to be installed alongside 15 hydraulic extrusion presses, the largest of 5,500 tons capacity. The extrusion presses had been used in World War II.

Three contractors in succession undertook the operation of the pilot plant, the third of which, Bohn Aluminum and Brass Corp., was the original World War II extrusion plant operator and has recently returned.

It has been stated that the forge presses in this plant now installed will be operated for aircraft production, due to the shortage of other commercial forge press capacity. But this arrangement is still to be finalized.

Russian Presses

Not too generally known is the fact that the Germans, who did most of the pioneering work on forge presses, delivered their first export 15,000-ton forge press to Russia as early as 1931. In 1938, a press of the same size was delivered to Great Britain.

► **Still Larger Press**—Russia, at the end of the war, seized the largest German press then operating—a 30,000-ton monster at Bitterfeld, Eastern Germany—and are reported to have reinstated it since in operation behind the Iron Curtain.

The Germans had a 55,000-ton hydraulic press well along in design at the Krupp Works in Essen at the end of the war. It is believed probable this and some smaller presses, both hydraulic and extrusion, are now in operation in Russia and Red satellite countries. At least one 12,000-ton extrusion press, operated in Germany, is known to have been moved to Russia.

How much these monster presses are responsible for the current large rate of Russian aircraft production has not been disclosed, but it is a fair assumption that they play a large part in the new post-war Russian industrial complex, which is building the giant Russian air war machine.

► **U. S. Program**—The $210-million forge press program is scaled down from the original proposal of the Munitions Board. E. V. Crane, an E. W. Bliss Co. engineer, was assigned in 1949 as a consultant to the National Security Resources Board to survey forge press and extrusion press needs for aircraft production.

As a result of his study, Munitions Board proposed 12 die-forging presses of from 18,000 to 75,000 tons capacity and 13 extrusion presses of from 8,000 to 25,000 tons capacity. Air Force then was asked by the Munitions Board in 1950 to have all the presses in operation within a two-year period.

This deadline obviously is close at hand, and obviously will not be met.

Gas Turbine Powers Navy Copter

Kaman Aircraft Corp. has completed two successful test flights of its gas-turbine shaft-powered K-225 helicopter. Original flight which took place Dec. 10, represented the first time a helicopter with such a power system had been flown in the U.S.

Each of the two test flights was approximately 10 min. duration. The flights were termed "completely successful" by the Navy Department, although there admittedly were some difficulties encountered controlling rpm. in power changes during flight.

Powerplant of the K-225 is the Boeing-developed XT-50 gas turbine, which develops 175 maximum continuous shaft hp. and 210 shp. at takeoff. Weighing 200 lb., the engine has a diameter of 22 in., a length of 42 in., and a frontal area of 2.2 sq. ft. normal fuel consumption is 1.3 lb./ehp./hr. The XT-50 is a two-stage turbine without mechanical connections between two stages, except for the shroud and engine frame.

► **System Classified**—The small gas turbine has been undergoing various tests in trucks and boats for some time, but the Navy said this is the first time the engine had been applied to helicopter propulsion. Details of the power transmission system from engine to twin rotors are classified.

Navy would say only that "instead of using the velocity of gases for direct thrust, the power is used to turn the shaft to transmit power to the rotor blades."

The turbine requires neither a centrifugal clutch nor a cooling fan, as in the case of a reciprocating engine, and can operate on either kerosene or high octane gasoline.

Navy said it had ordered only one of the turbine-powered K-225 helicopters for test purposes of the power transmission system, and that if decision should be reached for procurement of the helicopter type it would be for a much larger and heavier-powered version.

▶**Performance**—Flight test programs yet to be completed are: hovering performance at two varying rpm.; top speed at two varying rpm.; ceiling determination and a comparison of gas-turbine helicopter performance of the K-225 with that of its 225-hp. Lycoming piston-engine counterpart, which was flown to meet CAA-established performance criteria.

Navy said it expects that all performance of the gas-turbine configuration would better that of the piston-engine version, except in maximum speed. Performance expectation in that category, Navy said, would be just about equal for either type engine power.

The original K-225 was developed to test an intermeshing rotor system and a servo flap control. Development was completed in 1946, and the system was tested in the company's K-125A on Jan. 15, 1947. The system was improved and was incorporated into a later version—K190, which was test flown in April, 1948. Later that year CAA approved the K-225 design for production and the copter was certified by CAA in April, 1949.

▶**Conversion Easy**—Although the copter was developed as a utility craft for agricultural purposes, Kaman was awarded a Navy contract for engineering studies of the craft's stability and handling characteristics. In 1950, Kaman received contracts from Navy for two new types of helicopters using the same intermeshing rotors and servo controls as were developed for the K-225.

These were the two-place HTK-1 trainer and the HOK-1 four-place liaison helicopter. Kaman won a Navy-sponsored competition for the gas-turbine engine application to helicopters, based on ease of conversion from the piston-engine K-225 to gas-turbine configuration.

Aero-Medical Lab Stays at WADC

Dayton, O.—Air Force contractors doing business with the recently transferred Aero-Medical Laboratory of Wright Air Development Center need not be concerned about hunting all over Wright-Patterson AFB for contacts.

It is a paper transfer of the lab's functions to the equipment laboratory, also a part of WADC, and has not resulted in any physical relocation of the 60-odd employes involved.

The transfer announcement, however, revived reports that the parent organization, Air Research Development Command, will be returned to Dayton from its present headquarters in Baltimore, Md. If and when the latter move is accomplished, it will be welcomed by many contractors who shuttle between ARDC procurement offices in Baltimore and project officers at Dayton.

New MiG Threat

● External wing tanks give planes range equal to F-86.

● But high winds and Red fuel problem aid U. N.

By A. W. Jessup
(*McGraw-Hill World News*)

Fifth Air Force, Korea—Range estimates for the MiG-15 are being revised upwards. Recent MiG appearances over Seoul reveal that the Red jet, equipped with external wing tanks, has a radius of action at least as great as the North American F-86 Sabre.

This knocks out earlier estimates which placed the MiG range shorter than the Sabre.

Operating from Manchurian bases, however, the MiGs have a more difficult problem reaching the Seoul area than the Sabres have going to MiG alley and the Yalu.

▶**It's an Ill Wind**—High winds—a 100-knot blow is a light breeze this time of year—prevail from 280-320 deg. There's little chance of coasting home. MiG return flights from the battleline to Antung must be a real sweat.

U. S. Sabres, Republic F-84 Thunderjets and Lockheed F-80 Shooting Stars, while they have to buck these winds going into enemy territory, can coast with the winds on the way home. That's where it counts.

Recent attack against the United Nations' front lines by MiGs was not done by Manchurian-based aircraft, unless the Communists have some miracle fuel. These MiGs carried bombs and no external fuel tanks. Furthermore, these reportedly were camouflaged. Obviously, they had to come from some small North Korean strip, probably no farther from the front lines than Pyongyang.

▶**Fuel a Problem**—As near as can be determined, the Reds moved a few MiGs onto an unimproved, frozen dirt or sod field. From there they can make nuisance, harassing raids against the U.N. lines. The current Fifth Air Force interdiction program virtually prohibits the Communists from doing more by making it impossible for them to ship in the tons of fuel required for any major MiG close-support effort.

Also, any major Communist installation close enough to the front would quickly be spotted by aerial reconnaissance and could be neutralized by the FAF fighter-bombers. Fighter-bombers now operate as far north as Sinanju on the Chongchon River with little difficulty or interference.

▶**Plenty of MiGs**—This does not mean that FAF is unconcerned over the rising capabilities of the Communist air forces. The Reds have enough MiGs to mount a continuing hit-run strafing attack against a limited number of U.N. advance airbases. Followed by conventional bomber raids, this conceivably could eliminate a large portion of FAF's fighter-interceptors, opening the way for heavier bomber activity against all U.N. installations in Korea.

It would also give the Reds a chance to operate bases within North Korea, something which they have tried in recent months without success.

The Communists would not do this for "free." They would pay a large bloc of their MiG force. And they certainly must prepare to accept a widening of the war with U.N. retaliatory bomber attacks against key Communist centers in Manchuria and North China.

Johnson Postpones Hearings at AMC

Senate Preparedness Committee, headed by Sen. Lyndon Johnson, has postponed hearings on "favoritism, kickbacks, and possible fraud" in the letting of contracts at Wright-Patterson AFB until after the first of the year.

A spokesman for the committee said that Johnson feels the hearings are of such importance that a majority of members should be present. When it developed that this was impossible, the hearings were postponed.

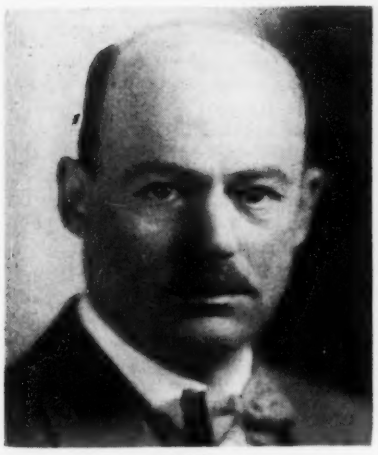
Meanwhile, committee investigators are continuing their investigations at the base. "Almost our whole staff of investigators have been taken off other projects and placed on the Wright Field job," the spokesman said.

Need Cargo Planes

(*McGraw-Hill World News*)

Melbourne—Australian armed forces are pressing the government to place orders immediately for a number of modern air transports, which are conspicuously absent from lists of equipment recently ordered abroad.

Australian experts favor the Fairchild C-119, and the Chase C-123. However, there is strong pressure aimed at obtaining orders for British companies.



Hunsaker

Sikorsky

Hunsaker Sees Need for Secrecy

Wright Trophy winner suggests that we advertise our air power in-being, keep under wraps our research.

Warning that aviation research and development is indispensable national insurance against "accumulation of great stocks of standardized aircraft that may soon become obsolete" was given at the Wright Brothers Day Dinner Dec. 17 by Dr. Jerome C. Hunsaker, 1951 winner of the Wright Brothers Memorial Trophy.

He said that while research tends to accelerate obsolescence, under adequate security cover we can expect our own industry to apply research results to create superior models.

▶ **Security Need**—"Perhaps the capabilities of our air power in-being should be widely advertised while the objectives and results of research and development should be secret. While we may feel that some stupid things are done in the name of security the grossly stupid thing is the envy and malice of the Communist powers. So long as we are threatened, scientists and engineers must accept some restriction of the full exercise of their professional ideals", Dr. Hunsaker said.

Dr. Hunsaker received the Wright Trophy for his long-continued public service of enduring value to aviation as chairman of the National Advisory Committee for Aeronautics and as pioneer aviation engineering educator at Massachusetts Institute of Technology.

Dr. Igor I. Sikorsky, inventor of the first successful helicopter produced in the U. S. and engineering manager of Sikorsky division, United Aircraft Corp., received the other top aviation award of the day, acting for the U. S. helicopter industry. The award, the Robert J. Collier Trophy, was presented by President Truman at the White House.

Sikorsky's aviation career dates to 1909 when he designed a helicopter. His all-metal 14-place twin-engine S-29 landplane completed in 1924 was one of the first successful large commercial landplanes in the U. S.

▶ **Copter Life Savers**—Also speaking at the dinner, the Russian-born helicopter pioneer pointed out that all other services of the helicopter had been overshadowed by the "dramatic and indisputable value of its life-saving achievements." He reviewed helicopter-life saving history from the first rescue mission by an early Coast Guard copter in January, 1944, which carried blood plasma to the scene of a marine disaster at Sandy Hook.

Largely as a result of helicopter evacuation of wounded from Korean battle zones, the death rate has been reduced among wounded to 2.5% from 4.5% in World War II, he disclosed.

Vice Adm. Emory S. Land, president of Air Transport Assn., principal speaker, announced establishment of the plan to utilize U. S. civil air transport in the national emergency.

Dr. Harold E. Mehrens, supervisor of CAA's aviation education, received the 1951 Frank G. Brewer Trophy for his contribution to air youth education.

Lt. Gen. James H. Doolittle (Ret.), was toastmaster. Edward F. Slattery, Jr., president of the Aero Club of Washington, presided at the dinner which was sponsored by his organization. A large delegation of airline presidents and their representatives from all the scheduled airlines of the U. S. were honor guests at the dinner.

Super Cargo

● Seaboard & Western buys first five L-1049B Connies.

● And expects nearly to double its lift capacity.

First commercial sale of Lockheed's cargo version of the Super Constellation, the L-1049B, was made last week to Seaboard & Western Airlines, international freight operator, fulfilling S&W plans made more than a year ago.

When Seaboard gets its five cargo Super Connies early in 1954, it will have nearly doubled its present lift capacity and increased the speed of its freight fleet by about 100 mph. And, of primary interest to the freight carrier, it doesn't sacrifice range for the greater lift.

▶ **Range Is Big Factor**—Raymond A. Norden, Seaboard's president, long ago surveyed the specifications for all then-planned freight planes and selected the Constellation because of range. When it was pointed out that the Connie was not built for cargo, and that other planes had far more preferable loading arrangements, he answered that the plane could be modified as a freight carrier, and that for an over-ocean cargo

Turboprop Connie

When Lockheed's cargo Super Connie is equipped with Pratt & Whitney T-34 Turbo-Wasp engines in the Navy version designated R7O-1, the plane will cruise at 394 mph. at 25,000 ft. while carrying a 35,000-lb. payload. This was disclosed last week when Navy confirmed that T-34s would be installed in two R7O-1 transports (Aviation Week Dec. 17, p. 9).

Navy said the T-34 engines would be installed in the spring of 1953 so as not to disturb the present production schedule of R7Os with Wright R-3350 Turbo-Cyclone compound piston engines.

Pratt & Whitney, in pointing out that now both the Air Force and Navy have selected the T-34 to test transports (the engine will power AF's Douglas C-124B), said that the T-34 has completed a 150-hr. test, during which it showed a specific fuel consumption of .64 lb./hp./hr. at 5500 hp.

line range was the paramount consideration.

Subsequently, Lockheed started work on the L-1049 passenger Super Connie, and when plans for a cargo version became known, Seaboard's order was only a matter of time. Seaboard is paying approximately $10 million for the five planes and spares.

▸**36,000-lb. Lift**—With the long range that has become a standard feature of earlier models of the Constellation, the L-1049B of Seaboard will be able to haul 36,000 lb. of freight over the 2,000-mi. leg between Gander and Shannon at a cruising speed of 330 mph.

(Another cargo plane derived from a successful passenger transport, the DC-6A, as operated by Slick Airways hauls 30,000 lb. over its domestic routes.)

Seaboard now has seven DC-4s which lift an average of 15,000 lb. at a cruise speed of about 200 mph. Total annual lift capacity now is estimated at 53,600,000 ton miles with daily utilization of 14 hr. With the five L-1049Bs, annual lift capacity will be 98,500,000 ton miles with daily utilization of only 10 hr.

▸**Faith in Future**—As Norden predicted, the Connie has been modified as a freight carrier to overcome its original limitations as a design for passengers only. Features of this modification are detailed in a report in this issue of AVIATION WEEK beginning on page 20.

The $10-million order for the L-1049Bs is the second recent evidence Seaboard & Western has given of its faith in the future of international air cargo, despite the fact that Civil Aeronautics Board has not yet acted on the carrier's application for a certificate of convenience and necessity to engage in scheduled operations.

Ae week ago it announced the award of two fellowships to provide for study and research on air freight across the North Atlantic.

▸**Study Markets**—Each fellowship is worth $2,000 and is established in the Graduate School of Business of Columbia University. Seaboard is contributing an additional $1,000 to administer the fellowships and for publication of research reports.

Immediate aims of the fellowships are to study sources of supply and markets for products that can be flown across the North Atlantic; and to educate shippers, government and the professions in the opportunities which are now offered by air freight in world commerce.

The two fellowships, which will be awarded annually for an initial period of three years, are believed to be the only such educational aid established by an air transport company.

STRATOFREIGHTER parachutes supplies in test of new role as supply transport.

C-97 Takes on Still Another Job

To its many other capabilities—troop transport, hospital plane, freight, refueler—Boeing's Big C-97 Stratofreighter has added a new role: forward area supply transport.

In tests at Ft. Bragg, N. C. and Westover AFB, Mass., the C-97 demonstrated its ability to drop supplies by parachute to troops in the field. Both Boeing's overhead rail system and the Army's floor-roller method were used in carrying out the loading and dropping tests.

In showing what it can do as a supply transport, the C-97 carried everything from helicopters to 155 mm. howitzers. In one demonstration, the plane hauled a bulldozer weighing 15,770 lb.

In addition to its role as a supply transport, the C-97 is fully convertible to its other uses. By attaching a pod to the space normally used for the plane's rear clamshell doors, the Stratofreighter becomes an aerial tanker. A Boeing crew recently made this conversion in six hours, ten minutes.

American Orders 25 New Douglas DC-7s

American Airlines and Douglas Aircraft Co. last week announced purchase of 25 new highspeed Douglas DC-7 airplanes by the airline at a total cost of $39,750,000. The new plane will be 40 inches longer than the Douglas DC-6B, and will be powered by four Wright R-3350-30W turbo-compound engines, rated at 3,250 hp. each.

Flying transcontinental New York-Los Angeles, with one stop at Chicago, the new plane will cut flying time to 8 hr. 10. min. eastbound and 8 hr. 55 min. westbound. This will chop approximately an hour off present one-stop flying time, and even faster non-stop flight schedule will be possible.

The plane is credited with a cruising speed of 363 mph. and a top speed of over 400 mph. It will transport 60 first-class passengers as compared to 52 passengers in the DC-6B first-class plane. The DC-7 as a coach would accommodate 95.

Delivery on the first of the DC-7s is expected late in 1953, and they will start in transcontinental service Jan. 1, 1954.

In minimum takeoff weight, the DC-7 figures at 116,800 lb. as compared to 100,000 lb. for the DC-6B.

Merger of 2 Coast Airlines Expected

Washington observers expect CAB to approve merger of West Coast Airlines and Empire Airlines. The Board suggested the merger in an opinion last summer in denying a merger proposal of Southwest Airways and West Coast.

Stockholders of both companies have approved a plan filed with CAB for West Coast to buy Empire.

West Coast and Empire both serve the Northwest. West Coast serves western Washington and Oregon; Empire serves Idaho and eastern Washington and Oregon. Their routes at present do not connect; they operate parallel north-south systems, each on its own side of the Cascade Mountains.

P-W to Build Atomic Aircraft Engine

Pratt & Whitney Engine division, United Aircraft Corp., has been awarded an Air Force contract for "work on the development of an atomic aircraft engine."

A release issued jointly by the Atomic Energy Commission and the Air Force said only that the Pratt & Whitney contract was in addition to other contracts in the same field. Unofficial reports indicated, however, that the Pratt & Whitney contract would seek an application of atomic energy to an aircraft engine different from that of the General Electric Co.

▶ **Atomic Heat**—There are several theoretical applications by which propulsion for an aircraft may be derived, observers pointed out. All would be built around a system for transfer of heat to propulsive energy.

Two most popular methods in general discussion currently are that the nuclear reactor would generate heat for a turbojet type or turboprop engine.

These popular conceptions have given rise to speculation that the General Electric development contract will apply a nuclear reactor to a turboprop engine and that the Pratt & Whitney contract will project development of a turbojet type atomic engine.

Consolidated Vultee Aircraft Corp. was awarded a development contract for designing and building the aircraft which would be test bed for USAF's first atomic aircraft engine. Unofficial sources predict that in general configuration this plane would be similar to the giant B-36 bomber. There were unofficial indications that a second airframe contract would be let for a plane to use the Pratt & Whitney engine, if it proved promising.

▶ **Engine by 1960**—Announcement of the award to Pratt & Whitney seems to indicate that construction of a practical atomic aircraft engine is nearer than had been previously disclosed. Official estimate for development time of such an engine has been set at "by 1960".

Sumner T. Pike, last of the original members of the Atomic Energy Commission who resigned two weeks ago, declared during a recent press conference that "some problems concerned with development of a practical atomic engine for aircraft presently seem insuperable." Weight of shielding for such an engine in an aircraft, he said, would approximate some 50 tons. This great weight, he declared, does not include weight of the engine itself.

▶ **Weight vs. Fuel**—Other quarters, however, point to the fact that weight of fuel of the B-36 when fully loaded exceeds 60 tons. With the fuel weight factor largely eliminated in operation of the atomic engine, this group believes the weight of the shielding material presents no great obstacle, even if it could not in any way be reduced.

Just when development of a practical atomic aircraft will be completed remains conjectural.

Airline M-Day Plan Is Given Approval

Defense Secretary Robert A. Lovett has approved the airline mobilization plan that marks "several hundred" of the four-engine airliners for 48-hour call to Air Force service.

Next month the airline presidents will meet with Defense and Civil Aeronautics officials to work out final details, such as aircraft modification contracts, war risk insurance and accelerated amortization.

Former Commerce Undersecretary Delos Rentzel directed the mobilization plan's preparation—with cooperation of airlines, military and civil aeronautics officials. That plan, as originally approved by Commerce Secretary Charles Sawyer, has awaited formal Defense modification and approval since last summer.

▶ **Victory for Airlines**—details on how many planes would go where under an M-day situation are top-secret.

The fact that Defense has definitely agreed and planned that the airlines will themselves operate the transports for the military is a major victory for the airlines. In World War II the Army took the planes over completely.

The broad outline of what's required appeared in AVIATION WEEK (Sept. 17, p.17) and in earlier reports on the National Security Resources Board Air Transport Mobilization Plan.

Essentially, the plan includes:

- **4-engine airliner diversion** to military air transport service control but airline operation in mobilization.
- **Modification** of those planes so they'll be ready to start over-ocean long-range operation within 48 hours of defense call.
- **Passenger priorities** system so that even while a big part of the airline fleet goes to over-ocean defense transport, essential passenger and freight service will not be curtailed.

The Joint Chiefs of Staff first approved the plan; then Defense Secretary Lovett delegated the military part of implementation to the Air Force; and Commerce Secretary Sawyer delegated the civil share of the plan's actual operation to Paul Butler, administrator of the new Defense Air Transport Administration.

Secretaries Lovett and Sawyer in announcing the agreement of the basic plan, issued a joint statement which reads in part: "The agreement . . . . is the first time in the history of the civil air industry that a completely coordinated plan for its mobilization has been attempted in advance."

ATLANTIC HANDLES LARGE LOAD OF BONANZAS

The response this year of Bonanza owners to Beechcraft's offer of annual free checkup is said to have been unusually heavy, as is indicated in this view of 17 of the small four-placers clustered around Atlantic Aviation Corp.'s hangar at Teterboro Airport, N. J. Two groups of factory experts will have visited about 35 certified service stations when they wind up their inspection clinics. The inspection, covering approximately 100 items, is done as a customer relations service.

VISIBILITY

by Swedlow

The BOEING B-47 stratojet is the fastest known bomber in the world. This great six-jet engine powered, swept-wing bomber will be produced in quantity for the U.S. Air Force by Boeing Airplane Company, Wichita, Kansas, the Douglas Aircraft Co., Tulsa, Oklahoma and the Lockheed Aircraft Corp., Marietta, Georgia.

Transparent laminated canopies and all-nylon fuel cell backing (in accordance with Boeing specification BMS-8-13) are SWEDLOW's contributions to the admirable functional efficiency of this superb fighting machine.

SWEDLOW was selected as a major supplier of these important factors because of SWEDLOW's unique reputation and more than a decade of experience in the development and fabrication of vital parts for the aircraft industry.

● ***We shall be glad to assign our staff engineers to work with you in solving problems in all phases of plastic fabrication.***

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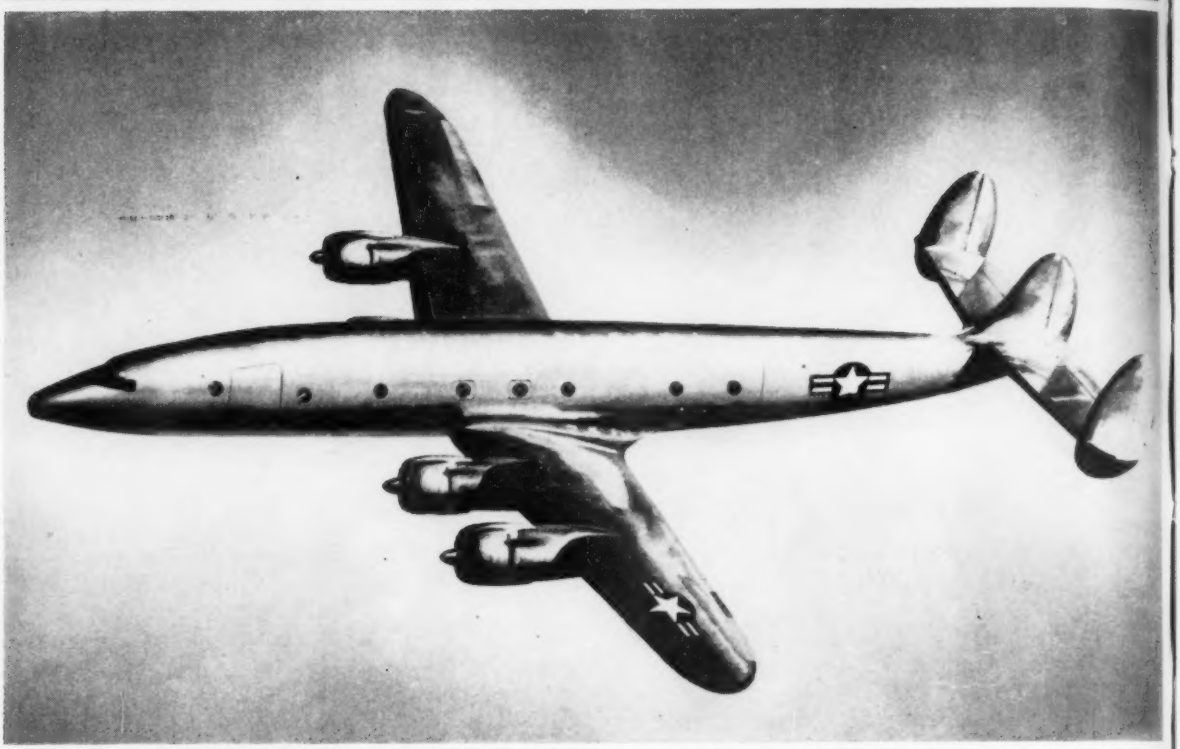
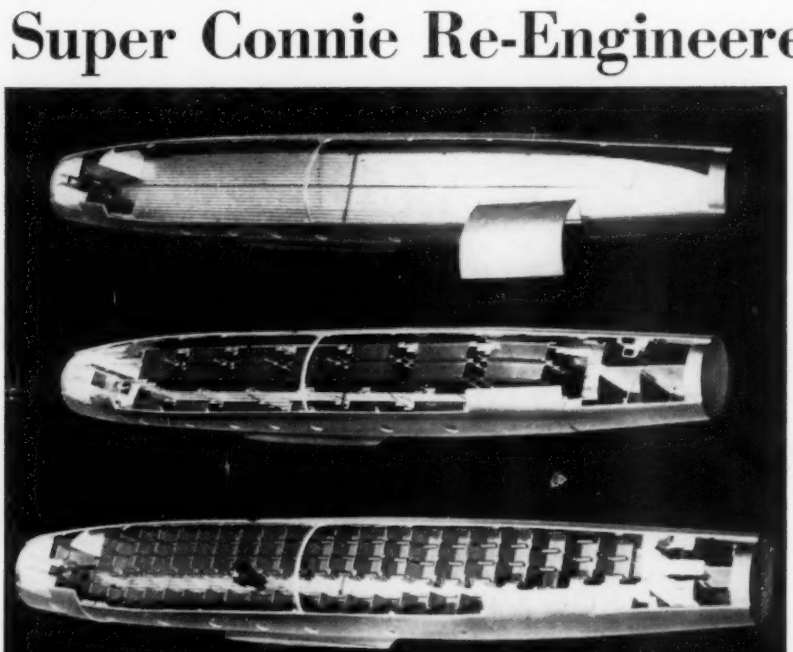


TRIPLE-DUTY SUPER CONNIE (Navy's R70-1, USAF's C-121C), as visualized by Lockheed Aircraft Corp. artist.

Super Connie Re-Engineered for Cargo



THREE BASIC CONFIGURATIONS for military are cargo (top), litter (center) with three tiers of stretchers, and transport (bottom) which can seat as many as 97 passengers.

• Freight - transport - litter model now in production.

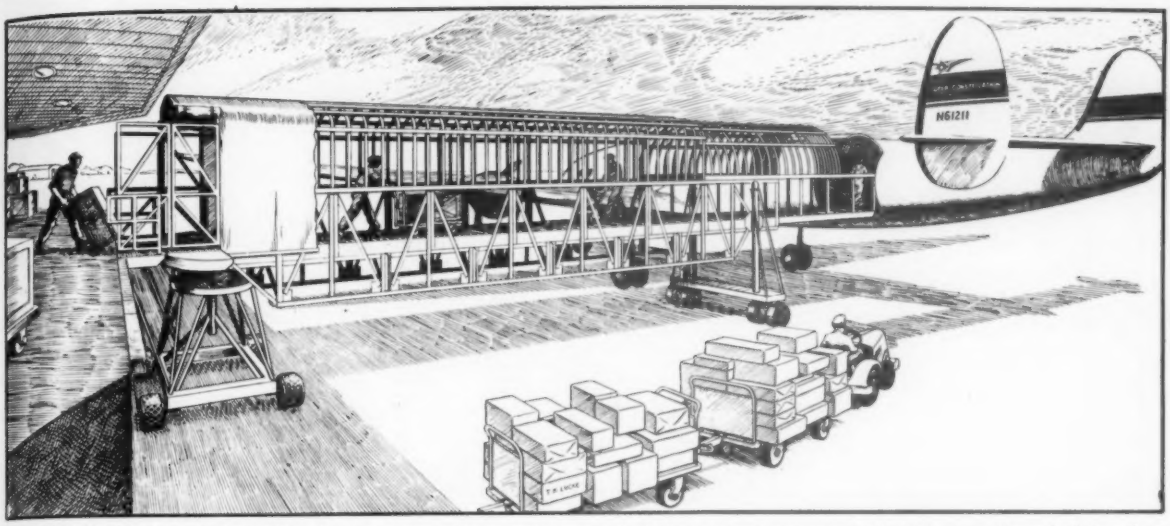
• New equipment developed for faster turn-around.

By Irving Stone

Burbank—The cargo version of the Super Constellation, which Lockheed Aircraft Corp. "has on tap" for the commercial air freight market, will be ready to go onto the production line with practically no engineering modification, as soon as it is ordered.

Sale of this 1049B-55 is being actively negotiated with several airlines, but Lockheed does not intend to go ahead with its construction until orders are confirmed. However, military versions of the cargo plane—the R7O-1 for the Navy and C-121C for the Air Force—are in building. It will be just a matter of extending production to put out the 1049B, since basically the three planes are the same.

For these aircraft, Lockheed—itself and in conjunction with others—has



AEROBRIDGE, being built by Airquipment, is portable, swiveling gangplank for moving passengers, wheeled cargo, from dock to plane.

developed ingenious and fast-handling cargo equipment to cut loading and turn-around time to a minimum.

The Navy has ordered more than 50 R7O-1s and the Air Force has tapped the company for a smaller number of the C-121Cs. The planes are slated for delivery to the Navy in the summer of next year, and probably will be used on both continental and trans-Atlantic runs. Delivery to the Air Force will come slightly later.

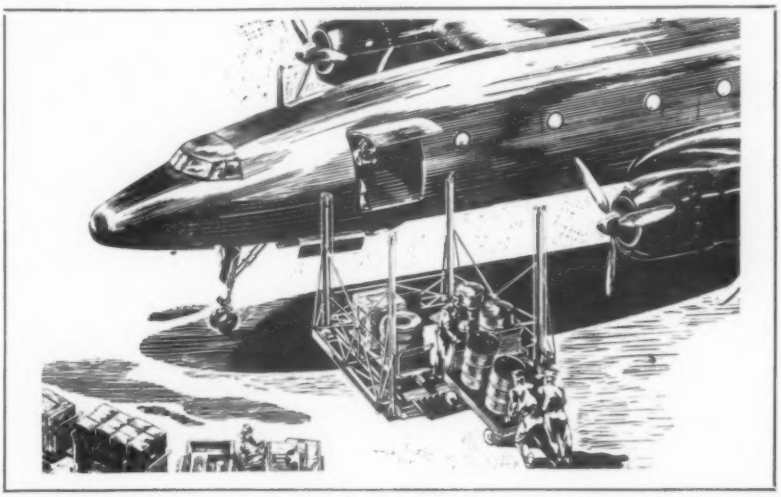
▶**Three-In-One**—Actually the aircraft will embody three basic utilizations—cargo, transport, litter—or a combination of these functions.

For all-cargo operation, there is a maximum of 5,568 cu. ft. of volume (4,875 cu. ft. in the main cabin and 693 cu. ft. in lower compartment), but this would be cut down slightly for intercontinental and military arrangements. There are two doors on the port side: forward, 5 ft. 1½ in. x 6 ft. 4¾ in.; aft, 9 ft. 4¾ in. x 6 ft. 2½ in. This rear door, Lockheed says, will permit loading of a package 73 ft. long, 49 in. high and 10 in. wide.

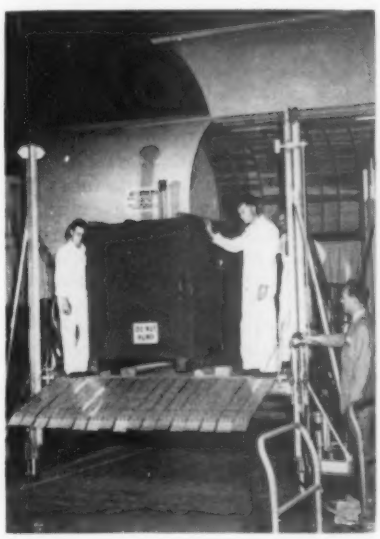
Tiedown fittings which can take 3,680 lb. stud the watertight magnesium floor (plywood floor on small section of rear area), down the center of which is a conveyor slot which can handle cargo items weighing approximately 12,000 lb. with a maximum full load speed of 18 fpm. The conveyor installation is optional equipment, but views of the R7O and C-121C interiors show its inclusion.

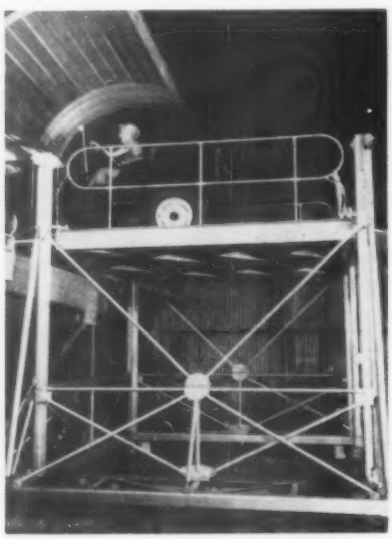
Cargo compartment has plastic-impregnated Fiberglas wall surfacing. Wall tiedown fittings which can hold 1,250 lb. are located on alternate frames. The cargo area is pressurized for altitude flight.

The evacuation version will accommodate 80 litter patients in four tiers

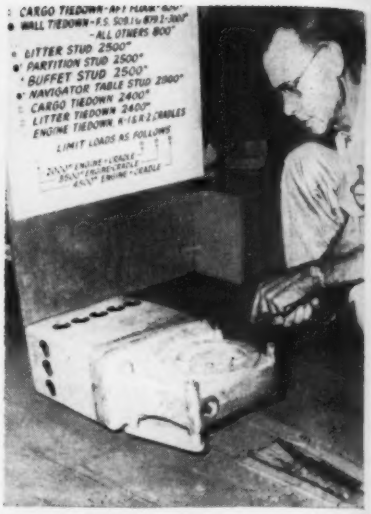


AEROLIFT cargo elevator will be tested by Army Transportation Corps at Ft. Eustis, Va.





RAMP makes loading easier, before lift goes up. Platform will support 10,000-lb. load.



FREIGHT POSITIONING is done quickly by Aerotrusty conveyor system. Location of pogo stick in floor fitting determines direction of cable pull. Power unit (upper right) drags "mouse" in sunken track. "Donkey" engages with "mouse" and tows the load (right).

of seven double rows on the starboard side and six single rows on the port side.

One military transport scheme with the starboard side fitted almost entirely with three seats abreast and the port side with two rows, will accommodate 97 passengers. An alternate arrangement with double seats on each side will do for about 62. The chairs are 16G units and face rearward for greater crash safety. They are foldable for stowage in the belly compartment.

► **Turboprop on Way**—Both the R7O and the C-121C are powered by Wright R-3350 Turbo-Cyclone compound engines with a dry rating of 3,250 hp. and a wet rating that probably reaches 3,500 hp. Now Navy has given Lockheed the go-ahead for a turboprop version.

Initially it was believed that the powerplant would be the Allison T-38, but latest information is that the choice has been firmed on the Pratt & Whitney T-34, which has a rating of at least 5,500 equivalent shp. at sea level. This is quite a jump from the power of the present compound engines, but obviously the new turboprops would not be too powerful for the basic Super Connie configuration.

The plane has been designed to take turboprops and no structural changes will be required, except at the attachment points of the nacelle structure to the wing leading edge. Lockheed's projection of the Super Connie with turboprops carries the designation 1049D and it has been reported that maximum payload would be boosted to 40,918 lb. from 38,570 lb. in the compound-engine version (AVIATION WEEK Sept. 3, p. 16) and that speed at 25,000 ft. at 110,000-lb. gross would be 397 mph.

Lockheed itself has never announced what turboprop engine was being considered in its studies, but if it was the T-38, then T-34 installations would give higher performance.

► **Fast-Freight Positioning**—Lockheed in its approach to air cargo's future has stressed freight-handling equipment. In conjunction with Lockheed Air Terminal, Inc., and Airquipment Co. it has developed accessory units to ease and speed cargo loading.

One of these units is the Aero-Trusty conveyor. This comprises an aluminum alloy track taking the place of a standard floor member and serving as a guide for a conveyor chain (capable of exerting a pull of 4,000 lb.) and load-moving devices. The track protrudes less than ¼ in. above the floor and at each end sprocket housings are mounted flush with the floor.

The drive chain is engaged by a toothed "mouse" contained in the track opening. A "donkey" attached to the mouse pushes or pulls the load.

A quick-removable portable power unit (multi-speed reversible motor operating from the plane's electrical system) and worm gear box, both fitting on top of the front sprocket housing, drive the system.

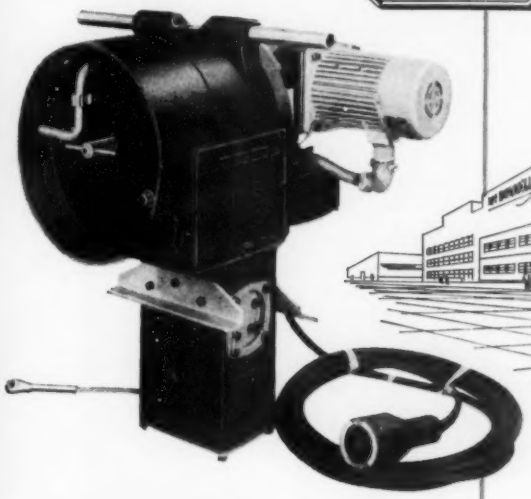
A snatch block with directing cable attached to the mouse draws cargo laterally into the fuselage onto the track, to be pushed by the donkey. A "pogo stick" with pulley at the bottom fits into any of the floor hole fittings and is used with cable to pull cargo onto the track from the fuselage sides or from the latter onto the aluminum track.

The 143-ft., 75-lb. chain is easily removed by one man in 15 min. and need not be carried when the plane is used as a personnel transport or in its litter version.

► **Quick Lifting**—Another cargo-handling unit is the Aerolift—for raising

the Installation is Confidential

BREEZE MARK



but the WINCH is Hot News

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To speed the changes of jet engines — anywhere, anytime — on the line or in the field.

SOLUTION:

A portable battery-operated Breeze Engine Winch, quickly installed in the aircraft itself, permitting removal or installation of the engine at will, with drum for 300 inches of cable. *Weight:* 103 lbs., *Load:* 2,600 lbs., *Motor:* 27 volt DC, reversible.

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Job engineered, welded-diaphragm bellows.

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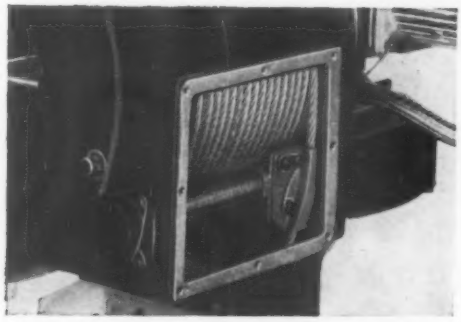

Close-up view of winch with cover removed, showing detail of cable crank and shaft mechanism.

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. . . is more fantastic than the patter of the pitchman or the spiel of the barkers that doubled in advertising and sales a generation ago. For example:

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To many engineers and executives, such silicone facts as these still sound too good to be true. That's why we have built and assembled 16,000 pounds of demonstration units and typical applications to prove that our silicone products will do all that we claim for them. This is the first comprehensive Silicone Exposition ever assembled. Previewed in Washington, D. C. during the week of October 22nd, this exhibit will be given private showings in major industrial centers across the country.

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freight, vehicles, or litters from the ground to the airplane floor.

U. S. Army Transportation Corps has ordered one of these units for testing at Ft. Eustis, Va. The Navy and Military Air Transport Service are also investigating its possibilities, the former having made auxiliary power provisions in the tail of the R7O-1 for operating the Aerolift.

The lift is a mobile, knockdown, air-transportable elevator designed for use with most types of cargo transports. It may be quickly disassembled, stowed, and carried in the lower cargo compartment of the R7O, C-121C, R6O, R6D, C-97, C-82, C-119 and other planes. It will also function as a lift and platform for maintenance crews.

The elevator platform is 10 ft. square and is supported by cables at each of its corners. This deck rises 125 in. above the ground, and in the down position is 6 in. above ground level. A platform ramp facilitates movement of wheeled equipment onto the lift. Platform's load capacity is 10,000 lb., and 500 lb./sq. ft. concentrated load.

The frame is mounted on four rubber-tired wheels, but when the elevator is operating, the load is transferred to four jacks. Actuation of the lift is by an electric hoisting winch and cable drum drawing its power from the plane's electrical system or any ground 24v. supply.

▶**Dock-to-Plane**—For loading wheeled air cargo, passengers, etc., above the ramp area, Airquipment is building the Aerobridge for Lockheed.

This is a portable, self-powered gangplank bridging the span from the freight dock or terminal building to the plane's cargo or passenger door. The unit is adjustable in length and height and is powered for 180-deg. rotation and for movement along the terminal ramp area.

The main span is supported by two towers mounted on dollies. The inner dolly is guided along the face of the dock and the rotary and translatory motion is accomplished by power and steering mechanisms on the outboard dolly. On the outboard end of the main span is an extendible cantilever section. A removable weather canopy extends the entire length of the bridge.

Maximum extended length of the bridge is 89 ft. With cantilever retracted it is 76 ft. Unobstructed width of entire bridge is 8 ft. Height of bridge outboard end at the extended length is adjustable between 4 and 10 ft. Height at inboard end is normally 9 ft.

Maximum gross load capacity is 23,400 lb. distributed along the fully extended bridge. Concentrated rolling load is 5,000 lb. (supported on 8-wheel, 3 x 6-ft. cart). Entire bridge deck surface can sustain concentrated wheel loads of 500 lb.

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V-Band Coupling Speeds Overhaul
Flange Bonded to Rubber Shock Mount
Gasket Bonded to Flange
A standard Marman V-Band Coupling saves an hour in overhaul time on Pacific Airmotive's Model 138 Cabin Pressure Regulator. Replacing a conventional bolted joint, this coupling speeds assembly and disassembly with its patented quick coupler latch and provides a light weight positive seal that has passed method 61 of A.A.F. vibration requirements.
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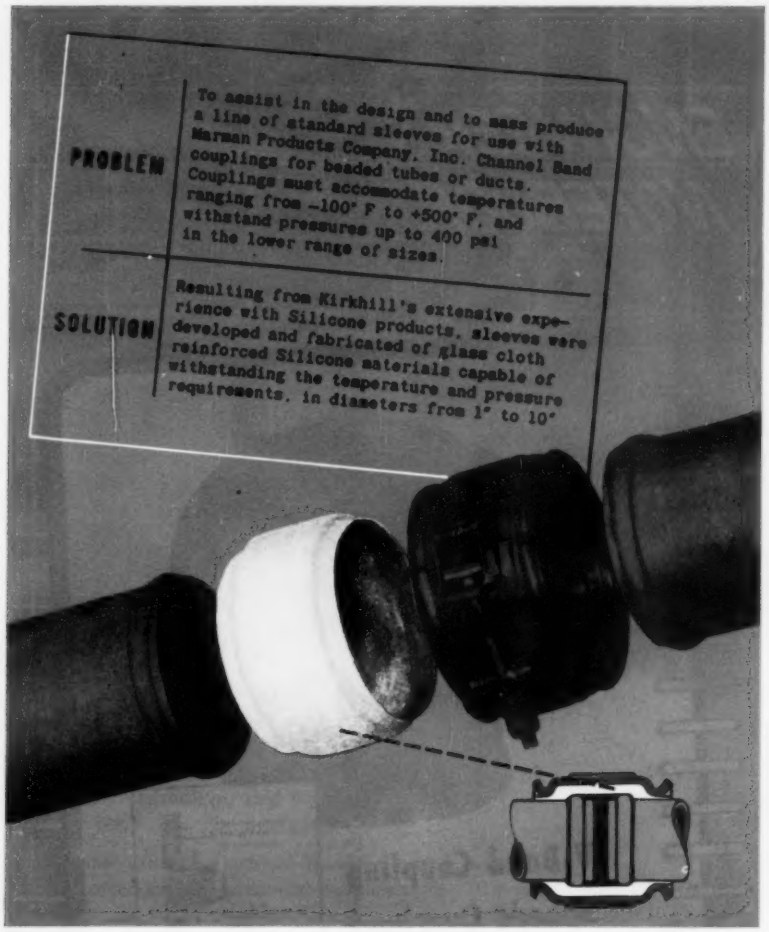
Standard Clamps for Special Applications

APPLICATIONS OF SILICONE RUBBER


PROBLEM
To assist in the design and to mass produce a line of standard sleeves for use with Marman Products Company, Inc. Channel Band couplings for beaded tubes or ducts. Couplings must accommodate temperatures ranging from −100° F to +500° F, and withstand pressures up to 400 psi in the lower range of sizes.
SOLUTION
Resulting from Kirkhill's extensive experience with Silicone products, sleeves were developed and fabricated of glass cloth reinforced Silicone materials capable of withstanding the temperature and pressure requirements, in diameters from 1" to 10"

WHEN TEMPERATURES ARE EXTREME

IT'S SILICONE PARTS BY KIRKHILL

Kirkhill Rubber is an experienced fabricator of Silicone materials. Our engineers and production men are constantly working with applications in this highly specialized field.

If the characteristics of Silicones—high and low temperature resistance, (from 500° F to −110° F) . . . chemical stability . . . excellent dielectric properties . . . resistance to weathering, oxidation, corona and ozone . . . can be of value to your problem, call Kirkhill. Our know-how and facilities are at your service.

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Our technical representatives will gladly assist on your design problems.

Giant Mandrel Pulls Stainless Cones

A giant expanding mandrel has been installed at Ryan Aeronautical Co. for exerting a 600-ton pull in stretching stainless steel cones to precise size for jet engines. Weight of the unit is 34,000 lb. Height, including hydraulic cylinder and piston, is 17½ ft.

The machine operates under 5,000-lb. oil pressure which is fed to the cylinder which in turn pulls a shaft expanding the segmented mandrel.

Presently the unit is in service above the floor, with workers supported on scaffolding, but Ryan plans installation in a pit with only the segmented expending dies above floor level.

This is the third large mandrel installed at Ryan. Pulling capacity of the other two approximate 71 and 150 tons, respectively. The new unit was designed by Ryan's designer C. C. Hasty, Jr. and plant engineering draftsman D. W. Linder. Waldrip Engineering Co., Los Angeles, built the job.

And Now Electricity From Radioactivity

Electrical current generated directly from radioactivity is finding its first application in a line of precision measuring instruments developed by the Ohmart Corp. of Cincinnati.

The basic principle of electrical energy production from radioactivity, discovery of which is claimed by Philip E. Ohmart, president and research director of the firm, is the first new method of producing electricity in nearly half a century.

These atomic batteries are being applied to the design of a line of precision instruments for measuring gamma activity, which is now in production at Ohmart.

Ohmart made this discovery while working as a research group leader at the Mound Laboratory, Miamisburg, Ohio. He holds an Atomic Energy

A Merry Christmas to you, United, and our congratulations to the nation's oldest airline on the occasion of its silver jubilee. It seems incredible, but it is true that your twenty-five years have spanned the entire history of commercial aviation. Collins salutes you for the tremendous contributions your pioneering has made in the development of what is now one of America's greatest industries.

First Officer Robert Refvem (left) gives Captain James O. Johnson a demonstration of a Collins 18S high frequency radio transceiver. On the second rack below are two Collins 51R very high frequency omnirange navigation and communication receivers. These types of Collins equipment are standard on all United Air Lines Mainliner Stratocruisers.

COLLINS

COLLINS RADIO COMPANY, Cedar Rapids, Iowa

11 W. 42nd St., NEW YORK 18 **1937 Irving Blvd., DALLAS 2** **2700 W. Olive Ave., BURBANK**

A million Btu per hour! That's the total capacity of the six Janitrol heaters aboard this brilliant new transport. "Comfortization" of the cabin is provided by two Janitrol S-100 heaters from which warm air is ducted to individual outlets for the passengers. The same heaters also warm the cockpit and provide windshield anti-icing. In addition, four S-200 heaters are installed in the engine nacelles for wing, vertical stabilizer, and tail surface de-icing. All four of these heaters are connected by ducts to a common plenum located beneath the cabin compartment from where heat is directed to the wing and tail surfaces. Eastern and TWA, like most airlines, have had long experience with Janitrol combustion heaters which led them to specify "Janitrol" with full confidence in their dependability, performance, and economy. Consult your Janitrol representative on any problems concerning heat—wherever you want it.

NEW STORY OLD TWIST

Eastern and TWA specify Janitrol heat in the Martin 4-0-4

Janitrol now standard equipment in the 4-0-4, as on scores of leading commercial and military aircraft.

AIRCRAFT AND AUTOMOTIVE HEATERS *with the whirling flame*

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Commission patent on the basic principle of energy production by this new means.

▶**Instruments**—Typical of the applications of the atomic cell is the Ohmart Type Model A Gammometer. It consists of two units—cell box and indicator. The cell box, which contains the radioactive heart of the unit, is a cylinder about 4 in. diameter and something over 7 in. long. The indicator is in a cast aluminum case 8 in. deep and 9 in. wide with a sloping front panel.

One of the main features claimed for the line of instruments is that only one electron tube per unit is required, in contrast to the 20 or 30 tubes required in some other types of units.

Shielding of instruments for measuring radioactivity is not ordinarily needed, because the quantities of radioactive material are so small that there is no danger if proper handling methods are used. A lead shield around the outside of the cell can be used to reduce background count.

In gas analysis equipment, for example, pure alpha and beta radiating materials are used to energize the cells. These materials are not hazardous.

In the case of liquid level gages, which use gamma radiation, the sources are kept as small as possible and are shielded as well.

▶**Small Current**—The amount of current generated from radioactivity is small. In one test battery at the Ohmart company, the current was about three micro-amps. This value decreased over a period of time with the decay of the radioactive material. (If plutonium were used as the source of radioactivity, the battery would still be producing current after 20,000 yr.)

Future plans for the company include the production of a personnel dosimeter, a water monitoring device and a new type of liquid level gauge.

Preliminary catalog sheets are available on letterhead request from the Ohmart Corp., 2347 Ferguson Rd., Cincinnati 38.

Plan Turbine Copter

Air Force is going ahead with its turbine-powered Piasecki XH-16. The project is reported moving along as previously planned. The 44-passenger copter will be powered by two Allison T-38 turbine engines. First XH-16, however, will be conventionally powered with two Wright R-1820 engines.

Wet-Blasting Cleans Jet Engines

Pratt & Whitney Aircraft is using wet-blasting to prepare jet engine parts for inspection. Employed primarily for cleaning components of experimental engines after running and disassembly, the process uses Cro-Plate Co., Inc.'s Cro-Hone equipment, spraying an agitated high-velocity water stream with suspended fine abrasive from aspirator guns.

The guns operate on shop compressed air lines and the force of the abrasive particles produces a clean smooth surface without removing any significant amount of metal. After cleaning, the parts are rolled from inside the processing cabinet and rinsed on the supporting turntable with fresh water which is drained into a catch basin for settling the grit so that it may be recovered.

Three operators can work at the equipment simultaneously.

The wet-blasting process is reported to overcome the coarse abrasive effect of sandblasting and to cut down time and the chance for damage that would be involved in hand-cleaning.

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POSITION SERVO ACTUATORS

ZERO BACKLASH for LIFE...

independent of extreme precision

Zero backlash is achieved in Duncan & Bayley Position Servo Actuators by virtue of design rather than high cost fabrication. No springs, no close tolerances on gear centers, no split gears are employed. Reduced shock loading eliminates excessive tooth wear. In addition, Duncan & Bayley Position Servo Actuators incorporate these PLUS advantages.

- Function independent of ambient temperature beyond most airborne requirements.
- Eliminates motor armature inertia; effective torque to inertia ratio improvement 20:1. Torque is independent of speed.
- Torque repeatable for equal conditions within ±1% independent of speed.
- Improved amplification factor, output 80 watts for 40 MA (3 watt) control.
- Continuous heat dissipation 40% of maximum rating.
- Life consistent with typical industrial machinery.

Applications for Duncan & Bayley Position Servo Actuators

Radar antennae transmissions

Autopilots

Computer Drives

Valve Servos

Tension Controls

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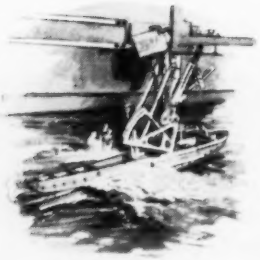
Seaplane research is bringing new phantoms to life in Stevens Tech's towing tanks, testing ground for the U. S. Navy Marlin's advanced hull design.



Delicately instrumented models prove today's dreams for tomorrow's air-sea power at the Experimental Towing Tank, Stevens Institute of Technology.

AN instrument-covered seaplane model knifes through the waters of a Stevens Tech towing tank. A Naval Bureau of Aeronautics researcher pores over plans for a jet-powered, swept-wing flying boat. A Martin engineer makes dreams take wings on his drawing board. And, step by step, planes that combine water-based mobility with land-based speed come closer to reality!

Latest product of seaplane research teamwork, today's advanced Martin P5M-1 Marlins add new sinews to our Navy's anti-submarine forces. Their performance is in the tradition of the history-making Martin seaplane flight to Catalina in 1912, the famous Martin China Clipper, the dramatic rescues of Mariner patrol planes and the record-load-carrying Mars flying boats of World War II.

Today's seaplane research promises to make their jet-powered successors tomorrow even more potent weapons in America's arsenal! THE GLENN L. MARTIN COMPANY, Baltimore 3, Maryland.

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NACA in Market for Research Employes

The National Advisory Committee for Aeronautics has announced a series of available positions paying from $3,410 to $10,800 per year.

Examinations for the job openings require no written test and have no closing date.

One group of appointments will be for the position of aeronautical research intern, and carry a Grade GS-5 salary of $3,410 for the basic 40-hr. week. Applicants for these positions must have completed a full four-year course in an accredited college or university leading to a bachelor's degree in any of the major sciences or engineering subjects.

The other group of appointments falls in the category of aeronautical research scientist. The job grades are GS-7 to GS-15, and pay a starting salary of $4,205 to $10,800 depending on the grade. Basic educational requirement for these positions is the same as for the intern class above. However, for the lowest grade, applicants must have had a minimum of 6 months' research experience. Additional experience raises the grade for the applicant.

All necessary forms and further information relating to these appointments can be obtained at Civil Service regional offices, at any first- or second-class post office, or directly from the U. S. Civil Service Commission, Washington 25, D. C.

Testing Devices Record Tension

Two new lab testing aids are recorders for the Baldwin lever-type creep machine and 4,000-lb. creep-relaxation machine.

Developed by Baldwin-Lima-Hamilton Corp., the recorders use identical strip chart drives. Creep specimen deformation of .020 in. produces 10 in. of carriage movement across the chart, which is driven by a synchronous motor at ½ in./hr.

A 300-day record is carried on a 150-ft. chart roll.

For creep-relaxation data, lowering of stress in a specimen, maintained at constant tensional strain at any temperature up to 1800F, is recorded by a conventional Microformer (variable miniature transformer) type servo system operated as an extensometer on a spring block loading device through which constant strain is maintained. The receiving Microformer moves the pen across a 10-in.-wide strip in proportion to the tension load on the specimen.

MEMORANDUM
To W.L.S.
From G.S.G.
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THRUST & DRAG

Rocket engineers have often wished they could look inside the motor and see the combustion process. Now it has been done by two General Electric Co.'s engineers on Project Hermes, GE-U. S. Army Ordnance guided missile project. In a paper at the recent American Rocket Society convention, Kurt Berman and Stanley E. Logan described the motor and the results of almost 50 exploratory runs. The motor had a full-length window of polished quartz in the combustion chamber. Strip and high-speed movie cameras were used to photograph the experiments. As one result, high-frequency instability of combustion was watched for the first time, and a plausible theory was advanced for the cause and nature of this rough operation, the paper revealed.

* * *

General Electric Co.'s unannounced high-thrust jet development—the J-53—probably has been resolved into a long-range experimental project, from which the engine may emerge not only as a top contender in the aircraft power class but also as a powerplant for a very large missile. Originally tagged at 15,000 lb. by AVIATION WEEK (Dec. 4, 1950, p. 22), the engine's output no doubt has been boosted by this time. A very large turbojet by present-day standards, it not only could power piloted aircraft but also could be used as an expendable jet plant for a platform-launched supersonic missile with a fast rate of climb and relatively short flight duration. In this role, the J-53 would be fabricated of non-strategic (substitute) materials and could push out, for a short time, perhaps as much as 25,000-30,000 lb. thrust for supersonic flight.

* * *

British guided missile development, far behind comparable work in the United States, has reached the point where test firings are beginning at the Woomera testing grounds in South Australia. First missile to undergo final proof flight tests is under development for the British Navy by Armstrong-Whitworth Aircraft. This is presumably a surface-to-air missile for use against enemy aircraft. Fairey Aviation Co. also has personnel at Woomera doing developmental work on guided missiles.

* * *

Two more research contracts have been placed at New York University's College of Engineering, bringing the current value of such work well over the $1 million mark. Both new contracts are under the aegis of the aeronautical engineering department. Office of Naval Research sponsors one investigation on the effects of blast pressures on buildings and airplanes. The other investigation was awarded by International Nickel Co., and covers studies of the effects of stress along with studies of the fundamentals of warping of heat-resistant metals at high temperatures.

* * *

Unusual and compact flasks for the storage of cold fluids—such as liquid oxygen and nitrogen—have been developed for the Air Force at the National Bureau of Standards. Basis of the design is a cylindrical shape (to use rectangular space efficiently) and a long heat-conduction path between liquid and surrounding atmosphere. Flasks have been tested at pressures of 200 psi. at room temperatures, and have operated at −300F at pressures of 150 psi. Evaporation loss rates with the new cylindrical flasks compare favorably with those of the conventional spherical units.

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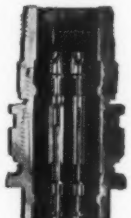

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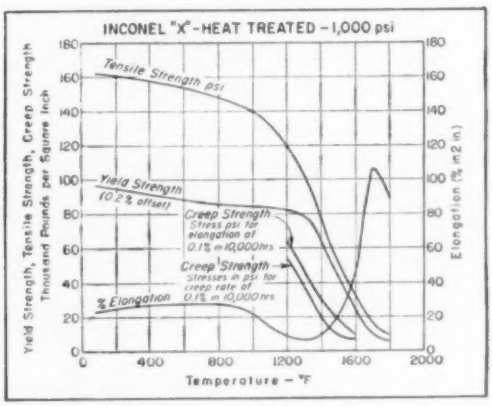
An oxidation-resisting alloy with very high strength over 1000°F

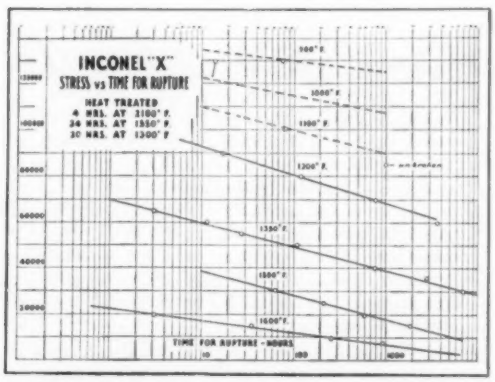
Inconel "X"® is an age-hardenable alloy which is unusually strong both at ordinary temperatures and at red heat. Suitably heat-treated, Inconel "X" has low creep rate under high stresses over 1000°F—and exceptionally high spring properties up to 1100°F.

The principal engineering characteristics of Inconel "X" (besides those shown on accompanying charts) are:

- **Oxidation Resistance**—Tests indicate that oxidation resistance of Inconel "X" is of the same order as that of Inconel.
- **Fatigue Strength**—Measurements of fully heat-treated Inconel "X" on rotating beam machines, at 100,000,000 cycles, show fatigue strengths ranging from 55,000 psi at 1200°F to 36,000 psi at 1500°F.



Short-time high-temperature properties of fully heat-treated Inconel "X".



High-temperature stress-to-rupture properties of fully heat-treated Inconel "X".

- **Impact Strength**—For fully heat-treated Inconel "X", typical impact strength values are: 33 ft. lbs. at −320°F, 37 ft. lbs. at room temperature, 67 ft. lbs. at 1500°F, and 113 ft. lbs. at 1600°F.
- **Hardness**—By proper heat treatment, the room temperature hardness of Inconel "X" can be developed as desired from BHN 140 to BHN 400.
- **Spring Properties**—By a combination of heat treatment and cold working, Inconel "X" develops unusually high spring properties. For spring applications from sub-zero temperatures up to about 650°F, it is useful where otherwise unusually strong ferrous springs must be used. Up to 1100°F, Inconel "X" springs will give useful performance where few other metals can be relied on.
- **Machining**—Inconel "X" is machinable in all conditions. Because of its strength and toughness, it cannot be machined as easily as softer metals; it can, however, be machined at entirely satisfactory rates.
- **Forging**—No unusual difficulties are encountered in forging Inconel "X", though heavier equipment than that used on ordinary steels is required.
- **Welding**—Inconel "X" can be welded by nearly all commonly used methods including: metal arc, inert gas metal arc, atomic hydrogen arc, resistance spot and seam, resistance butt welding. In common with other age-hardenable alloys, proper controls must be exercised over welding procedures. It is suggested that Inco's Technical Service section be contacted for recommendations on special jobs.
- **Applications**—Inconel "X" is used in gas turbine rotor wheels, blades; heavily stressed bolts; expansion bellows; valve springs in resonant jet engines . . . wherever a combination of high stress and extreme heat must be met.
- **Forms Produced**—Inconel "X" is supplied in most commonly used mill forms—billets, rod, flats, rounds, hexagons, sheet, strip, bar, wire, seamless tubes, and welding rods.

FURTHER DATA AVAILABLE

Inconel "X" is now in urgent requirement for critical defense applications, and we cannot say now just how soon we will be able to supply it for normal uses again. But you can get detailed information about Inconel "X" in your return mail by writing for our 79-page reference manual "Inconel 'X' " Data and Information.

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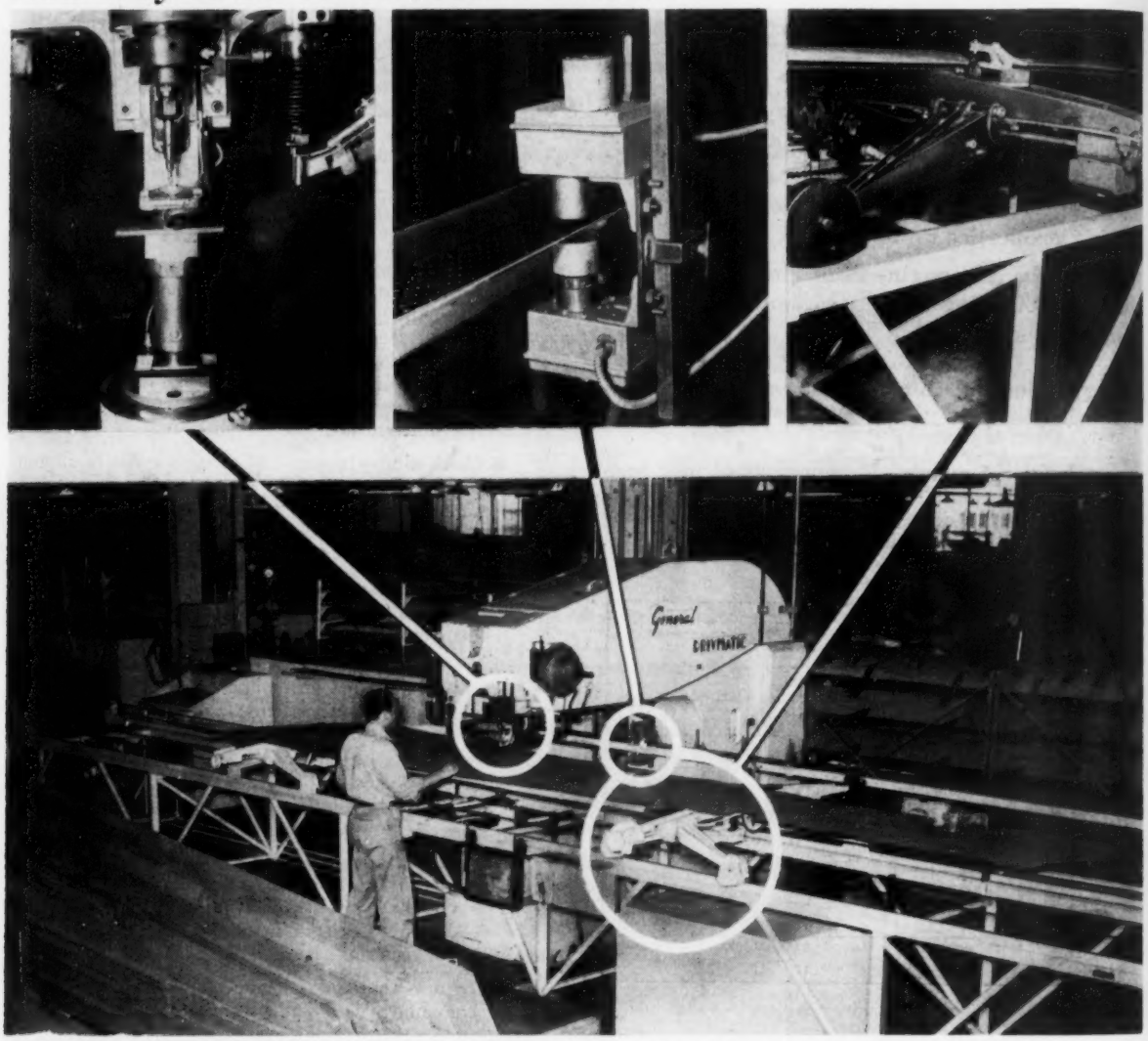
New Way to Do Three Jobs at Once . . .



HOW DRIVMATIC SIMPLIFIES riveting: insets show drill and rivet feet (left); hole and electric eye control (center), and the wing skin support with cross-travel dolly (right). Lower photo shows unit on NAA-designed skin handling jig.

Automatic Riveter Speeds Plane Assembly

Machine can press 22 rivets per minute, and NAA assembles it on frame which can handle full wing.

Los Angeles—Aircraft riveting has moved into the highspeed regime—with more accuracy and saving in labor. Many phases of this normally tedious and manhour-consuming assembly method have been taken over by the machine—an automatic unit known as the General Drivmatic Riveter.

Many of the airframe companies are using this machine, since the greatest percentage of airplane manufacturing costs is swallowed up in riveting the sheetmetal components. It has opened a wide field for cutting production costs by automatic drilling and riveting in fast, successive-operations.

► **What It Will Do**—Design limitations for the machine are relatively few—its throat depth (Model G-39) is 60 in. and it will take panels up to 120 in. wide.

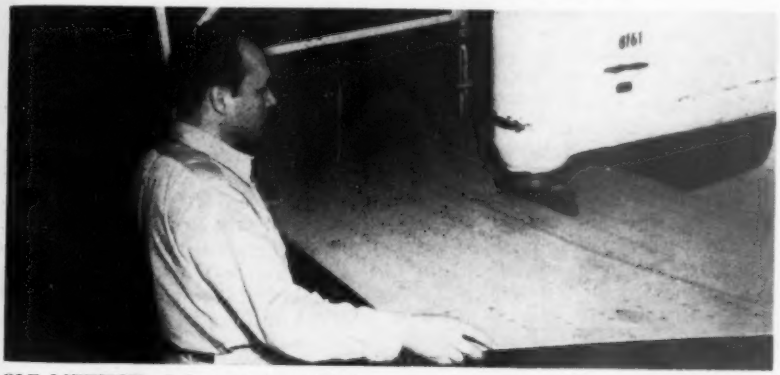
Depth of work can be 5½ in. and the sheet thickness buildup 1⅛ in. The unit will handle up to ½-in. rivets and it may be adapted for Hi-Shear fasteners. Length of panel that can be assembled depends on the tooling available.

At North American Aviation, Inc., one of the Drivmatics now is in operation and two others are being installed. The machine can press in 22 rivets per

But It Used to Be Three Operations . . .

OLD METHOD of drilling rivet holes through the template, required . . .

OLD METHOD of inserting the rivets by tedious hand process, and . . .



OLD METHOD of rivet pressing. All these operations now are done automatically.

minute but about 15 is the customary production rate.

▶**How Panel Is Handled**—NAA methods engineers have enhanced the utility of the machine by supplementing it with an ingenious skin handling jig and correlated electric-eye arrangement.

The handling mechanism frame is sufficiently long to accommodate the F-86 wing. The driving motor and associated gearing are at one end of the frame and there is an idler arrangement at the other end. An endless chain pulls a two-carriage support for the wing skin which is attached to it with quick-acting clamps.

Heart of the handling scheme is a spacing template having a hole pattern corresponding to the skin rivet pattern. The electric eye stops the handling mechanism's drive motor and the machine clamps the skin in place so that the assembly is held at the proper rivet location.

▶**Easy Shifting**—The Drivmatic's drill section cuts and countersinks the hole through the skin and attaching stringer, then retracts and a feeding mechanism puts a rivet in the hole. The squeeze ram upsets the rivet from the bottom, the clamp releases its hold on the skin panel and triggers the handling mechanism control to start the panel moving again—to the next hole point.

For indexing onto a succeeding row of rivets, the operator just pushes a button to release the indexing pins, easing the panel manually to the approximate position of the new row. Here, the indexing pins reengage associated holes for the new line of rivets.

Holes for the indexing pins are in a cross-travel dolly that rides in a track so contoured that the rivet hole and the rivet always will be perpendicular to the skin surface.

▶**Fast, Accurate**—One man operating the setup can rivet a complete F-86 upper or lower wing panel in about 2 hr. This job previously took about a day, first using a drill template for the holes, inserting the rivets by hand, then pushing under a multiple (gang) riveter for squeezing about 6 rivets at once.

Speed is not the only dividend gained. The machine bangs out work of "constant" quality—NAA reports that all rivets are centered at exact pressure, resulting in only a 1% rivet rejection. Under the old scheme about 12% of the rivets were rejected. Rivet-head milling for flushness also is practically eliminated, where formerly more than 90% of this milling was required.

NAA also reports the machine cuts riveter fatigue. —IS

No End In Sight For Parts Shortage

Shortages of military aircraft components resulting from delays by Defense Production Administration in cutting loose materials needed to make these items will be felt far into 1952 aircraft production, observers forecast last week, as steps to end the delay were finally being taken in Washington.

Anguished cries of aircraft components makers, who were hamstrung by low B-product listing for critical materials by NPA, were echoed in Washington as early as September (AVIATION WEEK Sept. 24, p. 220). Predictions that the aircraft components manufacturers would have to be given a special rating in order to end the numerous bottlenecks in plane production which were building up, were made the following month (AVIATION WEEK Oct. 1, p. 13).

Here is how the new setup is expected to shape up:

A list of from 25 to 50 of the principal components manufacturers is being compiled, including approximately 85% of the aircraft components manufacturing capacity. Qualification will be based on the percentage of aircraft components in their total production. NPA Administrator Manly Fleischmann suggested to limit it to companies with 90% aircraft component production, but a more practical limit of 75% is expected to be finally used.

These companies will be set up with A-1 ratings, equivalent to those held by

airframe and engine manufacturers, beginning with the second-quarter allotments of 1952.

Aircraft components manufacturers with shortages in the first quarter, and there will probably be plenty of them, are expected to be taken care of under the new emergency expediter setup which has been arranged for Controlled Materials Plan.

Revamping of the Munitions Board's Aircraft Production Resources Agency (APRA) at Dayton, under its new director, Col. Kern Metzger, is also expected to result in better handling of the materials for the components people, who will now, with aircraft plants, be right behind the Atomic Energy Commission and the machine tool industry in material priorities.

AIA Studies USAF Press Forge Program

Top U. S. aircraft manufacturing executives have taken another look at the forge press program which USAF has been urging for the last three years, as a followup to the annual Aircraft Industries Assn. board of governors meeting at Palm Springs, Calif.

J. Carlton Ward, former president of Fairchild and a large delegation of Wright Field specialist officers and engineers on manufacturing methods discussed the program with industry technical experts and leaders. Ward has been asked by USAF to conduct a study on the best methods to get the program rolling.

Goal of the meeting was to decide if the presses originally planned were suitable to U. S. aircraft manufacturing requirements, and how they could be best used in boosting aircraft production rates.

Adm. DeWitt C. Ramsey (Ret.) was re-elected president of AIA, as were other principal officers of the paid staff —Lee Webb, vice president and Harrison Brand, Jr., secretary-treasurer. Laurence Bell, president of Bell Aircraft Corp., and Robert Gross, president of Lockheed Aircraft Corp., were elected chairmen of the board of governors for the first and second six-month periods, respectively, of the coming year. They were also named vice-presidents of AIA.

Changes in the board of governors for the coming year include: Substitution of L. E. Osborne for D. W. R. Morgan, as Westinghouse Electric representative on the board; substitution of Lt. Gen. Ira Eaker for Lt. Gen. Harold George as the Hughes Aircraft Co. representative (both retired AAF generals are Hughes vice presidents); C. F. B. Roth, president of Aircooled Motors, and J. C. Garrett, president of Garrett Corp., were also named to the board.

Suppliers Move

● British dispersal plan boosts Canada air industry.

● U. S. also turns to north for production assistance.

Toronto—With Canada's military aircraft production program now well underway, many British-owned supplying companies are coming into the Canadian market.

Since one of Canada's two largest aircraft producers is a subsidiary of a British-owned corporation, numerous small and large component parts makers and machine tool makers have moved to Canada from Great Britain.

The fact that British-owned A. V. Roe Canada Ltd., had to start from scratch in designing and producing a jet fighter and a jet transport, as well as a jet engine to power the two aircraft, had an important bearing on the move of suppliers of the parent company in England to come to Canada.

▶ **To Build Nene**—The move is part of a larger British tendency to disperse its people and assets in case of another European war and also to capture some of the orders for military preparedness available in the dollar areas, particularly the U. S.

Announcement recently at Ottawa that Rolls-Royce of England is to open a factory to make its Nene jet engines in Canada (AVIATION WEEK Nov. 12, p. 11), is the latest in a series of moves which has seen an influx of British-owned companies come to Canada.

The Rolls-Royce plant will cost an estimated $250 million and will build 1,000 Nene engines at Montreal. Rolls-Royce has had an overhaul plant at Montreal several years.

▶ **Many Move In**—To meet the supply of parts needed for this plant and the A. V. Roe Canada Ltd. facilities at Toronto where the CF-100 Canuck twin-engined jet fighter and the Orenda jet engine are produced, British companies are setting up shop in the Toronto and Montreal areas.

In recent months big plants were begun by such companies as Light Alloys Ltd. at Renfrew, Ont., making magnesium jet engine castings; Sir George Godfrey & Partners (Canada) Ltd. at Montreal, to make pressurization equipment, and Rotax Canada Ltd. at Toronto, to make jet engine fuel and combustion systems.

There also have been a number of U. S. firms come to Canada in the past year in keeping with the military aircraft supply program. Largest of these is Canadian Steel Improvements Ltd., at Toronto, a subsidiary of a Cleveland concern, which will make jet engine blade forgings. Other subsidiaries of U. S. companies, long established in Canada, have expanded.

▶ **Not All British**—The fact that no aircraft engines and no jet aircraft have been built in Canada heretofore resulted in considerable searching for materials and parts and much experimentation. It was this search for components, largely by the A. V. Roe Canada organization, that brought about import of entire plants.

The Canadian industry is not entirely a branch of British aviation. For instance: Canadair Ltd., Montreal, a subsidiary of Electric Boat Co. of New York, is making the F-86 Sabre and the Lockheed Shooting Star for Canada, and the Beechcraft T-36 trainer for U. S. Canadian Car & Foundry Ltd. at its Fort William, Ont., plant is making North American Harvard trainers (T-6) for the Royal Canadian Air Force, and Canadian Pratt & Whitney is building a plant at Montreal to produce R-1340 engines for these trainers.

British capital is involved in de Havilland Aircraft of Canada Ltd., Toronto, which has for many years been producing lightplanes.

▶ **Other Production**—The company currently is in production of the Beaver, a Canadian-designed postwar single-engined, five-place transport for the U. S. Air Force as a liaison aircraft. It has made the Beaver for Canadian federal and provincial governments, and for export. It also designed and built a Canadian postwar trainer, the Chipmunk, which is now in production in Great Britain.

Bristol Aeroplane Co. of England has two branches in Canada, one at Montreal and one at Vancouver, to overhaul, repair and service its engines used on Canadian planes. Fairey Aircraft has a subsidiary near Halifax to service its aircraft used by the Royal Canadian Navy. And in the aerial survey field, Photographic Survey Corp. Ltd., has been established at Toronto, as a branch of the British Huntingdon group.

Titanium Carbide Gages Live Longer

Titanium carbide thread ring gages are reported to have shown exceptional wear-life after extensive testing in production use. A recent "call-back" by The Pipe Machinery Co., Cleveland, producer of the gages, showed "no measurable wear," the company reports.

Pipe Machinery registers every gage with a serial number engraved in the metal. Against this number are recorded the characteristics of the unit—lead, angle, diameter, hardness.

A special wear-check plug, provided with each ring, is a double-end type with one end slightly larger to detect any wear.

First in SAFETY

How to decelerate the landing run of jet planes on small fields was the problem. Parachutes seemed to be the obvious brake, but the rushing air tore the chutes apart. Then, the Switlik Parachute Company produced a drogue parachute using ribbons of nylon rather than a solid cone. The ribbons permitted some of the rushing air to escape but at the same time supplied sufficient resistance to brake the jet bomber. The chute is stowed at the base of the vertical fin and is released by the pilot from a cockpit control.

Switlik parachute brakes help make it possible for the jet bombers to operate safely from small fields when giving support to ground troops in combat.

One of the Switlik *firsts* from their research for greater safety.

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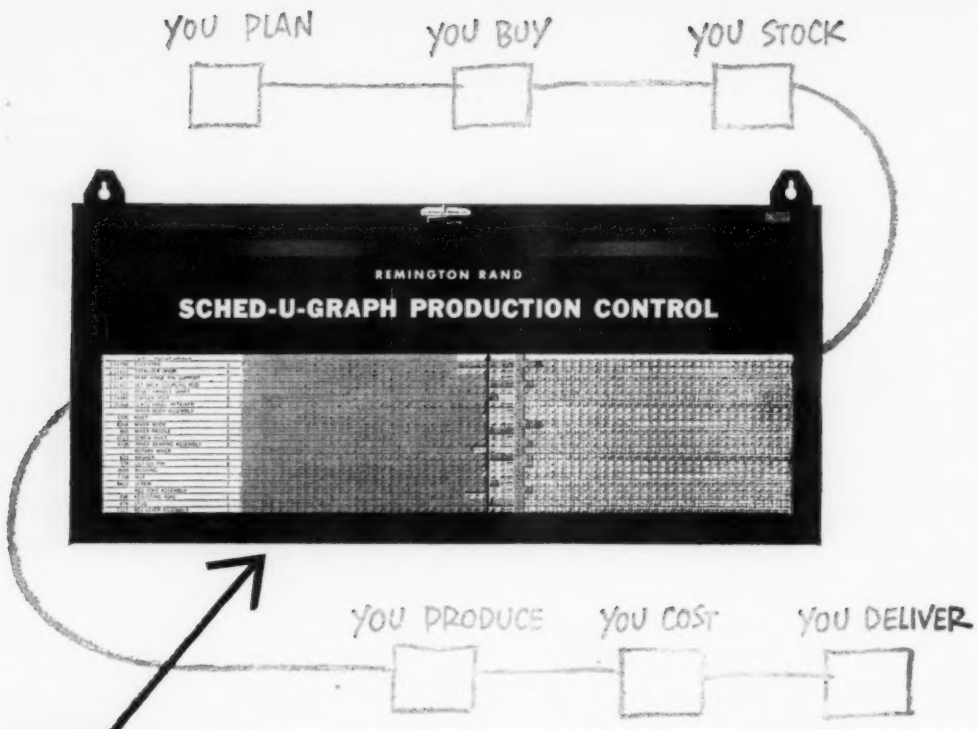

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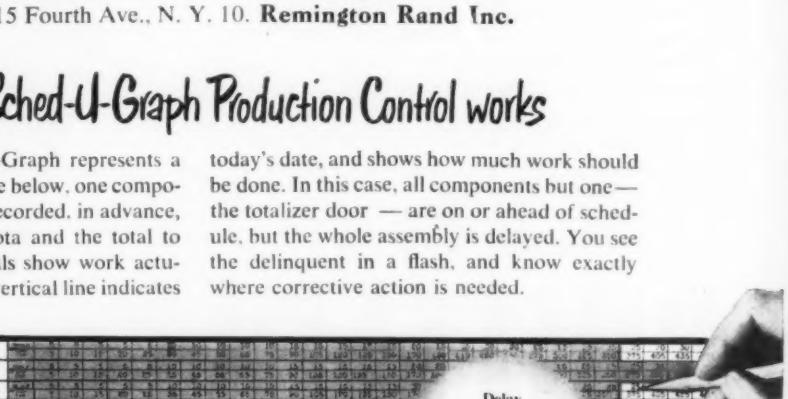
here's how Sched-U-Graph Production Control works

Top line on this Sched-U-Graph represents a pump assembly — each line below, one component part. On each line is recorded, in advance, each day's production quota and the total to date. The sliding bar signals show work actually completed. The black vertical line indicates today's date, and shows how much work should be done. In this case, all components but one—the totalizer door — are on or ahead of schedule, but the whole assembly is delayed. You see the delinquent in a flash, and know exactly where corrective action is needed.

	PUMP—MOTOR DRIVEN	
1-11392	ECCENTRIC	1
1-11415	TOTALIZER DOOR	1
1-11413	REAR HINGE PIN SUPPORT	2
1-11421	SET-BACK COUPLING ROD	1
1-11422	RESET HANDLE SHAFT	1
1-24946	CORNER POST	4
1-25364	GLASS PANEL RETAINER	2
	MIXER BODY ASSEMBLY	
3356	RIVET	1
8264	MIXER BODY	1
865	MIXER PADDLE	1



AIRCRAFT HYDRAULIC SPECIALISTS, facing up to specialized agenda at Vickers Conference, are pleased with results.

New Pattern Seen for Airline Meetings

• Maintenance specialists are pleased with plan of Vickers Conference: Aircraft hydraulics problems only.

• Meetings such as these may foreshadow de-emphasis of the technical side of industry-wide gatherings.

By Scott H. Reiniger

Detroit—The Air Transport Hydraulics Conference held here this month by Vickers, is seen as part of a pattern that eventually may be followed in other fields of airline engineering and maintenance, de-emphasizing the technical side of the annual conferences of the Air Transport Assn. (Another example is Champion's annual ignition meeting.)

Reason: Only specialists directly concerned with aircraft hydraulics were there. More ground was covered and in greater detail than at ATA meetings where hydraulics is but a small part of the agenda and representatives from the airlines generally are spread thin over a wide range of subjects.

Another advantage: Those present had a chance to discuss problems firsthand and observe work in progress.

▶**Best Ever**—These were the views of more than a few who attended the meeting. The conference was the best on aircraft hydraulics ever held, they told AVIATION WEEK. The meeting, opened by F. T. Harrington, Vickers vice president of sales and service, was attended by representatives of major domestic and foreign airlines, airframe and equipment firms, and the armed services.

High interest was shown in an "electrically-latched-on-center" variable displacement pump that can be shut down in flight by a switch in the cockpit when demands of the hydraulic system don't require its use. The unit was exhibited for the first time in the Vickers Laboratory. According to the company, tests in a military plane have shown the pump can save 400 lb. of fuel in an average flight. When electrically locked, pump load drops from the normal 3,000 psi. to almost zero, thus removing a heavy load from the engine. The principle can be applied to any piston variable displacement pump, Vickers explained.

Other highlights of the meeting:

• **All-out changeover** by airlines to nonflammable type hydraulic fluids probably is at least a year or more away, with coming months a time for appraisal and experiment with leading fluids now on the market (R. M. Hollingshead Corp.'s H-2 and Monsanto Chemical Co.'s Skydrol).

• **More initiative** on part of tubing makers in supplying the needs of the aviation industry is seen in increasing competition between aluminum and steel tube companies. This was the first aircraft meeting of its type where the steel tube industry was represented, says Vickers. Tubing is, perhaps, the major headache in aircraft hydraulics.

• **"Pulsation" no longer** is a selling point for the gear pump against the piston pump, favorable airline service reports indicated. A new valve plate for piston pumps produced by Vickers smooths out flow, to the extent that Douglas, Martin and Convair reported that tests showed "no significant difference in pulsation between gear and piston pumps of various design."

• **But gear pumps,** costing less than piston pumps, still are going to give piston pumps increasing competition in the 3,000-psi. hydraulic pressure range, in the opinion of some airlines. Martin 4-0-4s and Convair 340s will be equipped with gear pumps, representatives pointed out.

Vickers says its piston pumps may have a higher initial cost, but will save

money in the long run through lower running costs than those for gear pumps (Pesco).

• **Overhaul life** and ultimate life of piston pumps has increased roughly 100% since World War II, in face of a 15% increase in operating speeds, Vickers told AVIATION WEEK. This has been achieved through use of larger bearings, sturdier pump casings and eliminating parts that introduce harmful metal chips into system. Weight has gone up somewhat, but a drive is currently on at Vickers to bring it down again.

• **Piston accumulators,** used by the military because they can operate through a wide temperature range, may replace diaphragm types now used by airlines—unless someone comes up with a diaphragm that can compete with the piston accumulator.

Vickers told airlines it has been testing a new diaphragm compound every two weeks for the past two years and plans to continue the program until one is found that can meet low temperature needs.

• **Many hydraulic system troubles** can be traced to ground equipment, termed by one airline the "weakest link" in airline maintenance and service, it was brought out at the meeting. A need was seen for closer control of this equipment and improved procedures.

• **The feasibility** of adopting 5,000-psi. hydraulic systems in aircraft is being studied by Vickers and other groups involved. Aim would be to reduce weight through smaller units and increase efficiency, but there is a chance such a system might raise weight, instead. This is the crux of the investigation presently.

• **Explosion-proof motors,** not now a requirement, soon will be for electrically driven hydraulic pumps, it was the consensus of the meeting. It was pointed out that CAR-4B already implies this requirement.

▶ **Non-Flammable Fluids**—The conference brought out strongly divergent, almost heated, views on the relative merits of the main contenders in the non-flammable fluid race, Skydrol and H-2. A dark horse, only briefly mentioned, was a fluid now being developed at the Navy's request by Union Carbide and Carbon Corp.

• **Skydrol,** developed by Monsanto in cooperation with Douglas Aircraft Co., has a headstart in commercial use, already being used in cabin supercharger circuits by a number of airlines flying Douglas planes. It is an ester-base fluid.

• **H-2,** on the other hand, is a water-base fluid developed by Hollingshead in cooperation with the Navy and is finding extensive use in that service's planes. The meeting revealed that the only commercial user to date is Transocean Air Lines, a contract carrier, which has accumulated about 1100 service hr. on the fluid (AVIATION WEEK, July 16, p. 54).

▶ **Boiled Down**—Views expressed by producers of the fluids, users and non-users at the meeting boiled down to something like this: Both fluids apparently provide better lubricity than petroleum types now used, with Skydrol having the edge.

Experience indicates both fluids will present greater corrosion problems than oil types, with greater care, perhaps, needed with H-2. Overall non-flammable characteristics of H-2 probably are better than Skydrol under normal conditions. Also it can operate at lower temperatures.

Major objection to Skydrol seemed to be that it presently requires an expensive and time-consuming packing change. While the plane's hydraulic system is being converted, it must sit on the ground. Leading gripe against H-2 was that it apparently can separate too easily under certain conditions and presents bleeding problems.

There were reports of reduced pressure and overheating with use of H-2. However, transmission tests of the fluids have certified both are satisfactory hydraulic power mediums with Vickers equipment, the company revealed.

United Air Lines reported Skydrol had increased overhaul life of its pumps. Douglas pointed out that under present conditions Skydrol required duplication of ground equipment and that trouble had been experienced in the past in mixing up Skydrol with AN-O-366 petroleum fluid.

▶ **Work on Problems**—Monsanto raised hopes of overcoming these problems. The firm, in answer to an airline query, told the group that work now progressing to develop a packing that could be used both with Skydrol and petroleum base fluids had every indication of meeting with success.

It reported that Skydrol had proved its non-flammable capacity by not catching fire in an incident where a plane sprung a leak and Skydrol spilled onto a red hot brake drum. There was a flash, but no fire followed.

▶ **Navy View**—The Navy reported generally satisfactory results with H-2 and pointed out non-flammable characteristics of H-2 had been proved in combat, not necessarily a criterion for airlines.

Some operational problems have been encountered with H-2, but these were blamed primarily on poor handling and lack of instruction on the part of ground crews. New batches of H-2 being delivered to the Navy resist separation at temperatures up to 250F, it reported.

Two major airlines are planning to conduct tests on H-2 fluid in a Convair 240 and Douglas DC-6.

There was a good deal of talk about the fact that a fluid for the Air Force and Navy is not necessarily the right one for the airlines. For example, while H-2 can operate at lower temperatures than Skydrol (—60F compared to —40F), a requirement from a military standpoint, it was not necessarily a selling point to the airlines.

▶ **Leather Lather**—Occasions where H-2 caused early breakdown of cup-type leather packings were reported. Hollingshead, in answer to airline questions, said it didn't believe this would be a chronic trouble. It was brought out that a leather manufacturer had indicated the water in H-2 could cause deterioration of leather.

The Navy's report on H-2 seemed to indicate that while laboratory test of fluid might show certain deficiencies, in service these problems ironed themselves out or just didn't occur.

▶ **Foam Effect**—Companies that have experimented with H-2 indicated that it foams more than Skydrol, retains air longer and that parts immersed in H-2 had been known to corrode. Hollingshead and the Navy said that in service, foaming of H-2 disappeared after a few hours in the system, that bleeding presented no particular problem and that corrosion occurred because H-2 wasn't removed from the parts properly.

Lockheed reportedly found H-2 not suitable for the Constellation hydraulic system, which has an aspirator for the hydraulic reservoir.

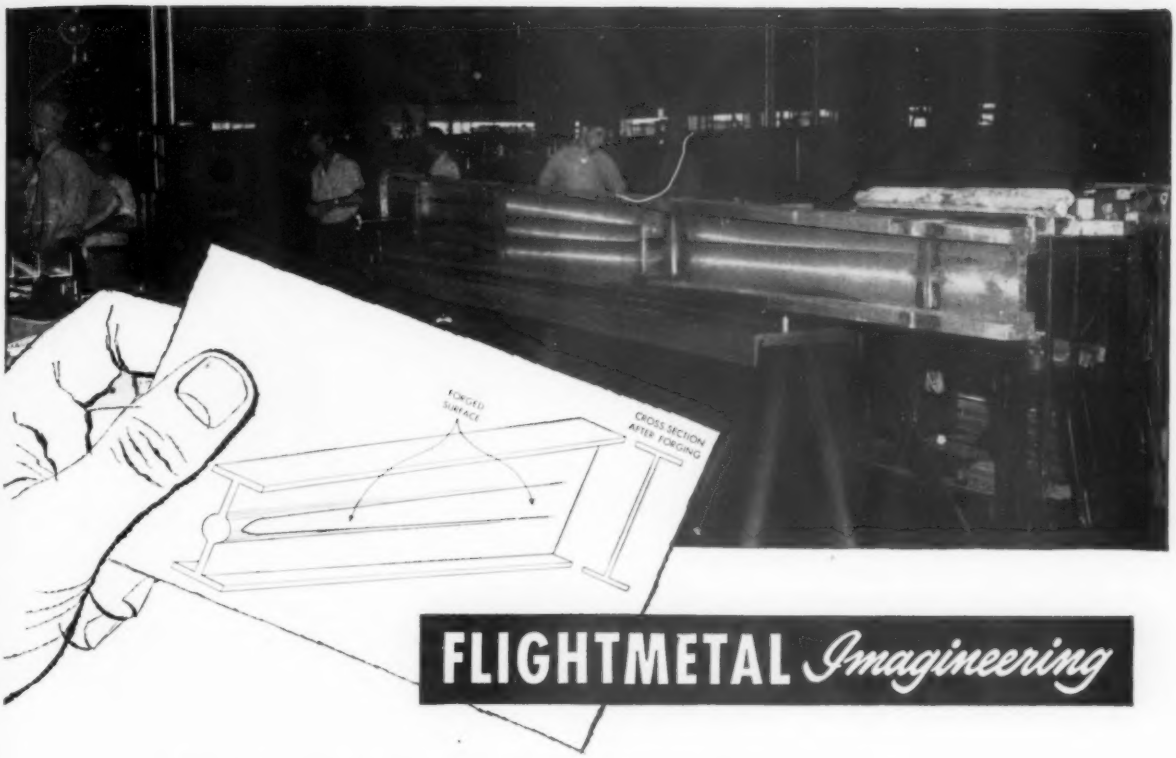
The Navy stressed that a plane using H-2 would never find itself in trouble in other parts of the world. British fluid, for example, can be used in the same system simply by flushing out the H-2, or standard U. S. petroleum base fluids can be substituted.

Simplicity of the fluid was emphasized. Ingredients can be obtained at any combination of grocery store, drugstore and filling station, a BuAer representative told the group.

The Air Force apparently has set its sails on a different tack in laying out a course for fluid development. An AF spokesman told the group none of the present fluids meets its needs. It is mainly interested in a product that will operate without breakdown at very high temperatures, non-flammability being a secondary consideration. AF is experimenting with silicone- and silicate-base fluids and halogenated compounds. A snuffer additive would be used to reduce flammability.

In light discussion between sessions some engineers questioned whether airlines needed a non-flammable fluid in the first place, there being few mishaps directly attributable to this cause in their view.

(The second and final article on the Hydraulic Conference will appear next week.)



FLIGHTMETAL *Imagineering*

forge-tapers a one-piece wing spar

Ordinarily, a tapered aluminum wing spar is made with two long machine-tapered, T-shaped extrusions. Takes about 50 major parts, a lot of rivets, many separate operations.

At McDonnell Aircraft, a production executive wondered...why not make a one-piece spar from an I-beam extrusion tapered by the forging process? He talked it over with Alcoa engineers... and now... McDonnell has built them into experimental aircraft.

The new spar is an Alcoa 75S-T6 Extrusion with a bulb of metal in the web. Forging flattens the bulb progressively, so that the 13-foot spar finally tapers from 15½ to 10 inches deep. Besides simplifying production, the one-piece spar is *50 pounds lighter* than the former design.

If you have a problem involving aluminum or magnesium, we'd welcome an opportunity to pool our facilities and know-how with yours in the interests of *Flightmetal Imagineering.*

ALCOA ALUMINUM MAGNESIUM

Ask ALCOA for the Flightmetal Training Aids you need

Alcoa's complete library of design and fabricating information is available now to help you train employees—add to your own know-how. Your nearby Alcoa sales office will supply books free, lend you films. Or check what you need on this coupon and mail to ALUMINUM COMPANY OF AMERICA, 1800M Gulf Building, Pittsburgh 19, Pennsylvania.

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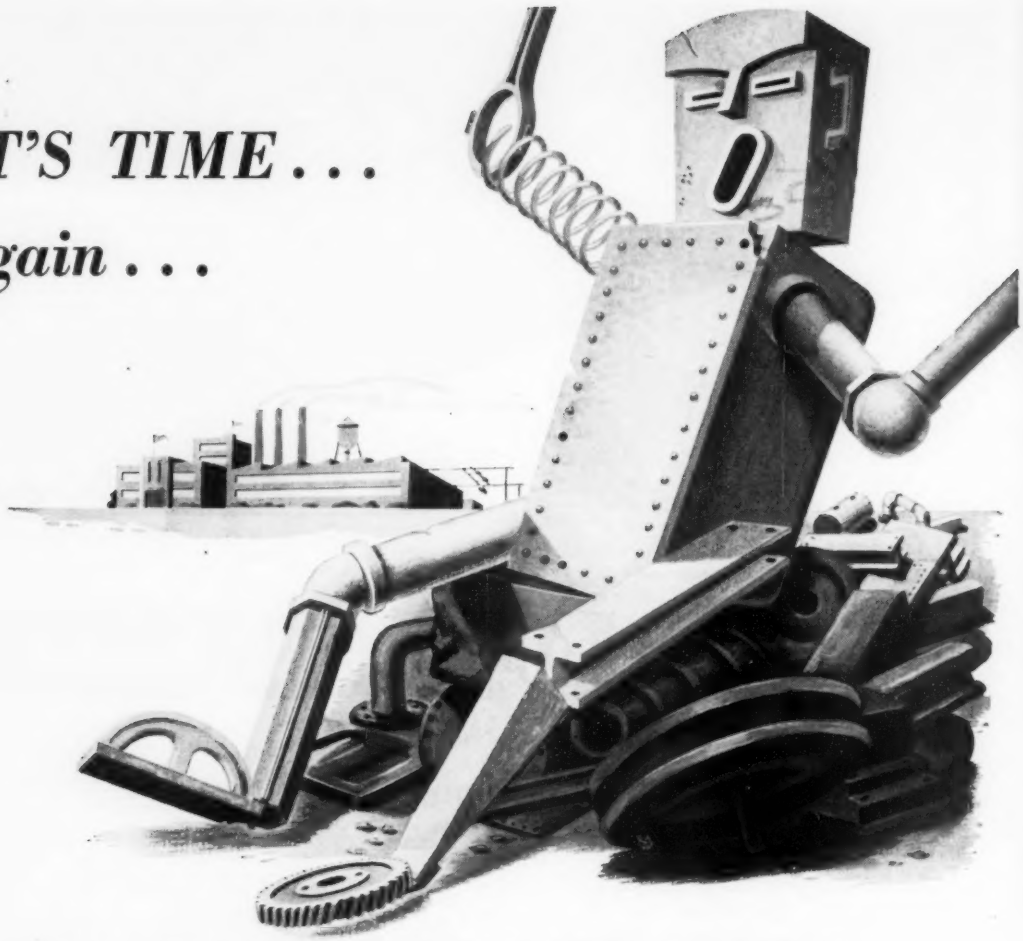
IT'S TIME . . .

again . . .



TO WAKE UP SCRAPPY!

Scrap's getting scarce again . . . compared to the amounts we need . . . and it's up to *all* of us to *help* produce enough steel.

107,000,000 tons of steel is the present rate of production in 1951 . . . 119,500,000 tons is expected in 1952.

Last year, 1950, we produced 97,800,000 tons.

All that extra steel—enough to take care of *both* military and civilian needs—calls for *more scrap iron and steel.*

Scrap Inventories Are Alarmingly Low

While steel mills are producing at a greater rate than ever, scrap inventories have dwindled. Many mills are operating on a hand-to-mouth basis with shut-downs threatened unless we furnish more scrap.

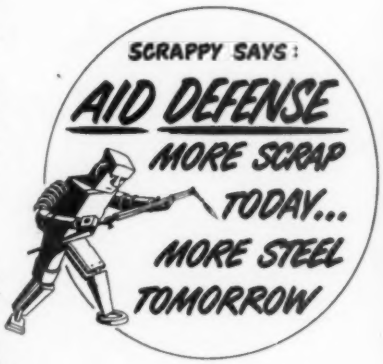
We *do* have the scrap. It's everywhere, not just in the form of *production* scrap—the "leavings" of machining, normally turned over to scrap dealers . . . but also in the form of *idle* metal: obsolete machines and tools, no-longer-usable jigs and fixtures, gears, chains, pulleys, valves, pipe, abandoned steel structures, etc.

We must have this *idle* metal to keep the furnaces running.

Please cooperate. Set up a Scrap Salvage Program in your plant—*now*. For a complete plan on "how to do it", write for booklet "Top Management: Your Program for Emergency Scrap Recovery". Address Advertising Council, 25 W. 45 Street, New York 19, N. Y.

Why Do We Need *Scrap?*

Steel is made half from pig iron, half from scrap. With production on the increase, more scrap must be purchased. And it's up to you to "dig it out" and sell it.



NON-FERROUS SCRAP IS NEEDED, TOO!

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New Meshing Unit Aids Jet Starters

A new, automatic jet starter jaw-meshing mechanism has recently been developed by Jack & Heintz, Inc. It is designed to assure positive meshing as long as sufficient current is available to rotate the starter armature.

The Cleveland firm says the unit "eliminates a potential source of trouble in jet engine starters, the dc. solenoid." When solenoid failure occurs, the starter cannot be engaged to the engine to turn it over.

This is how the mechanism operates: A phosphor bronze friction ring restrains jaw rotation, permitting a cam to ride down a ramp to extend the starter jaw. Tension on the friction ring decreases as the jaw moves out until, at full extension, all tension on the ring has been removed.

The starter, a constant current, variable voltage unit, has a rating of 0-30 v. dc., 1,000 amp., 800 rpm., 20½ hp., weight is 46 lb.; and overall length, including terminals, is 13 13/16 in.

Labeled the D31-1 starter, the unit incorporates a patented J&H quick-attach-mounting, permitting installation or removal in seconds.

C-54 Is Converted For Coast Airline

The first conversion of a basic Douglas C-54 to a "B" type aircraft has just been completed by California Eastern Airways, the company claims.

Heretofore considered impractical because of tremendous amount of work involved, the conversion now emerges as desirable because of increasing shortage and skyrocketing prices of four-engined equipment.

The California Eastern modification included increase of the aircraft's fuel capacity from 1,800 to 2,800 gal., raising its gross weight from 62,000 to 68,000 lb., and increasing its zero fuel weight from 50,600 to 53,400 lb.

Necessary engineering data for revision of the operating instructions were furnished by the Douglas Aircraft Co.

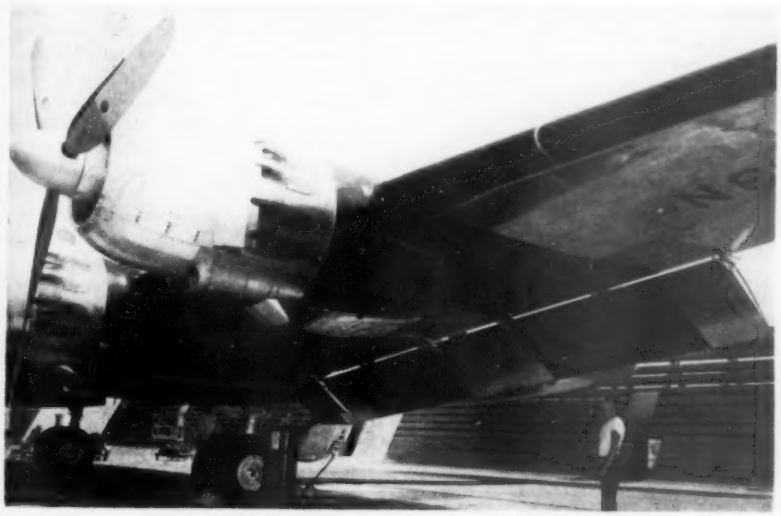
British Simulators Equal Those of U.S.

Great Britain is developing flight simulators which give as complete duplication of actual flight characteristics as those produced in the U. S.

A simulator just put out by Air Trainers, Ltd., is the first synthetic jet trainer to be designed and built in England.

The unit can be "looped" and put through other aerial maneuvers, has a top speed of over 600 mph. and a ceiling of 50,000 ft. Typical jet "whines" are faithfully reproduced through a loud speaker. One interesting innovation is a "G" simulator to reproduce gravity effects on the pilot in tight maneuvers. To achieve the G effect, a pillow under the pilot is inflated, pressing him tightly into his harness straps.

An instructor's console is provided. Instructor follows the aircraft's track by watching an automatic plotting arm

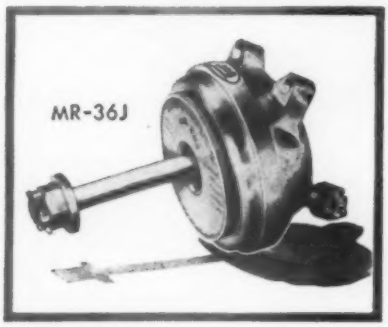


STRIPES FOR JET BLAST PROTECTION

To combat concentration of corrosive gases emitted from jet stacks used on Constellations, automotive-type enamel striping in wide bands has been applied. This protects metal skinning and hides the resulting smudge. First use of the method was on Trans World Airlines and Eastern Air Lines Connies. Chicago & Southern chose green striping. Aluminized lacquer has also been developed.

Increase Payload

20 lbs. for Convair 240
40 lbs. for Douglas DC-6



LORD DYNAFOCAL REWORK PLAN

Here is an opportunity for operators of 240's and DC-6's to add extra payload capacity by reducing gross weight.

Many of these airplanes were built before LORD developed the lightweight MR-36J Dynafocal which saves ten pounds of weight per engine mounting assembly. The LORD rework plan enables operators to return genuine LORD MR-36F Dynafocals to the factory for rework into the lighter MR-36J design. All parts receive 100% inspection . . . new rubber is bonded into cores . . . various metal parts are machined to new contours . . . and components showing undue wear are replaced with new ones.

Thus—at a fraction of the cost of new mountings—you receive factory rebuilt Dynafocals which incorporate the latest LORD design features. The weight is reduced to 30.5 pounds per assembly without sacrifice of strength or performance. Write to the attention of Product and Sales Engineering Department for specific information.

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Vibration-Control Mountings . . . Bonded-Rubber Parts

AMERICAN*

PACEMAKER OF AIRLINE PROGRESS

The phenomenal progress of the aviation industry in the past two decades owes much to American Airlines. Formed in 1934 in a consolidation of several lines, this organization has forwarded such developments as direct transcontinental flights . . . stewardesses . . . lower fares . . . bigger planes . . . faster schedules and sleeper planes. The same progressive attitude, applied to passenger safety, has influenced such advancements as preventive maintenance . . . schools for pilots and other personnel . . . micro-finish for aircraft cylinders . . . and many radio communication and navigation aids. In this field Bendix* Radio has been working with American Airlines since 1939, with such good results that, today, every plane of American Airlines, like those of every major airline in the world carries Bendix Radio equipment. Remember this fact whenever you buy radio equipment of any kind—it is the finest pledge of quality in the field.

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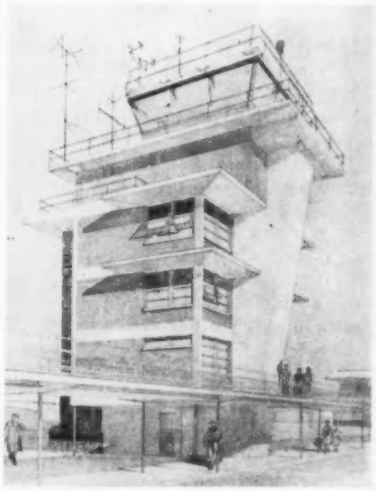
VHF Transmitters • H. F. Transmitters • Radio Control Panels • Antennas • Indicators • Automatic Radio Compasses • Marker Beacon Receivers • Announcing Systems • VHF Communication and Navigation Receivers • Inter-Communication Systems • H. F. Receivers • Ground Controlled Approach Landing Systems • VHF Omni-Directional Range Systems.

move over a map. He can also throw "bugs" into the machine, such as ice on the wings and erratic instruments.

Air Trainers, Ltd. has also built Link piston-engine trainers, a navigational trainer and is currently designing a simulator for the Ambassador and Viscount commercial airliners.



Futuristic Tower Is Airport Feature

Denver—Stapleton Field, Denver's fast-growing airport is initiating a new $3-million expansion and modernization program.

Example of Denver's modern approach is the futuristic control tower currently under construction.

In addition to the control tower, spacious new office buildings are being erected on the north side of the existing terminal building into which United Air Lines will move its operations headquarters upon completion.

A second addition will house expanded ticket counter space and other airlines activities. And enclosed walkways to loading gates and a large observation platform are included in the scheme of things, David G. Davis, director of aviation told AVIATION WEEK. Runway extensions are also contemplated, in the expansion plans, he said.

▶ **Modern & Functional** – Stapleton Field's terminal building, starting as a small, square and unimpressive structure, has blossomed into a modern and functional terminal. It is one of the few in the country that provide nursery service or private dressing rooms for air travelers, for instance.

Other innovations, rarely seen at other airports are:

• **Winter wheat** being grown and harvested in vacant areas between runways. This nets the airport several thousand dollars a year by serving a two-fold purpose. First, it eliminates the necessity

of weeding these large areas (the job costs several thousands a year) and second, the income from the wheat, sold on the open market, provides a source of revenue.

• **Model airplane** flying "circles" are available adjacent to the parking lot. This idea proved a boon to city and airport alike. The city was happy to have the noisy, spluttery, buzzing of model engines removed from its parks —and the airport is deriving extra revenue from youngster and parent who come out to fly the miniature aircraft.

The mutual interest fostered between air-minded citizen and air traveler is healthy for both and tends to create even more airline passengers, authorities believe.

Turco Develops Non-Etching Cleaner

A non-etching aluminum hot tank cleaner designed especially to remove all types of foreign matter, including stubborn, etching-type marking ink, has just been put on the market by Turco Products, Inc.

Cleaner is non-foaming, non-corrosive, and does not have a tendency to bake or leave a powdery residue. The solution may be agitated as desired to obtain mechanical scrubbing, which speeds the removal of soil from aluminum surfaces, manufacturer claims.

Labeled "Aviation," Turco says the product meets the corrosion requirements of MIL-C-5543 and was especially formulated for use on reactive metals such as aluminum, magnesium and their alloys. It may also be used with other metals.

The cleaner dissolves quickly in hot water, becomes a stable solution that will not sludge or "salt out" and will not etch or darken highly polished aluminum, the maker says.

Gas Relief Valve

A new low-pressure relief valve for gases and vapors is offered by the Andrews-Alderfer Co., 1028 Home Avenue, Akron 10. Designated the ANDAL Type C-13 relief valve, the unit is recommended by the manufacturer for use on rigid containers.

The valve is set to operate in the range between 7 and 10 psi.; adjustment is by a screw located at the top of the unit. Three models are available with choice of ¼ in., ⅜ in. or special pipe thread. Diameter of the valve is ¾ in., overall length is 1⅞ in. Materials are stainless steel, brass, steel or other construction as requested. Valve meets government salt spray test standards.

Further data are available from the manufacturer on letterhead request. Ask for data sheet No. C-13.

NEW BENDIX AMSPEAKER

Assures Constant Listening Watch!

Descend to... 3000 feet... and maintain...

The use of head phones in the pilot's cabin of large aircraft can now be as obsolete as head phones on a home receiver. For the first time in the industry, Bendix Radio is offering a simple combination package of speaker and amplifier. The Amspeaker is an efficient, compact unit that can replace head phones. It reduces fatigue . . . adds to comfort and convenience . . . and increases safety by providing a *constant* radio listening watch. One Amspeaker is mounted near the pilot, one near the co-pilot, and, if necessary, others can be mounted near other crew members. Both pilot and co-pilot can receive the same or *different* messages simultaneously. The Bendix Amspeaker is simple to install. Only three inputs are required: 115 AC, muting control and audio input from crew members' jackbox. It uses ruggedized tubes and is easy to service, too—the power supply and amplifier are built inside the speaker housing. Write for further details on Bendix Radio's newest advance in aviation radio.

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most trusted name in ...

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D-C Control Headquarters at your fingertips . . .

Aviation's phenomenal strides, coupled with the growing complexity of aircraft systems and accessories, have created a whole new set of problems in D-C electrical control. That's why today airframe and accessory manufacturers are turning to Hartman — D-C Control Headquarters — for solutions to these specialized problems.

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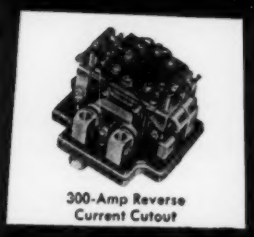
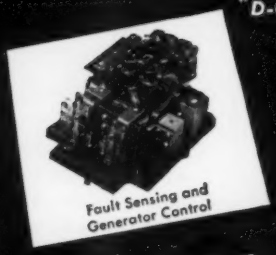
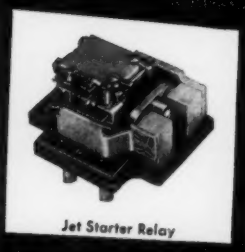
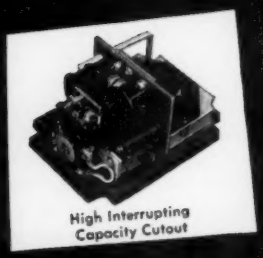
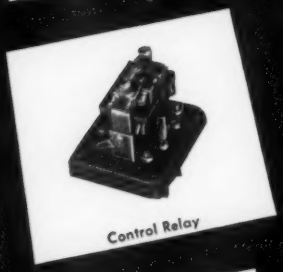

300-Amp Reverse Current Cutout

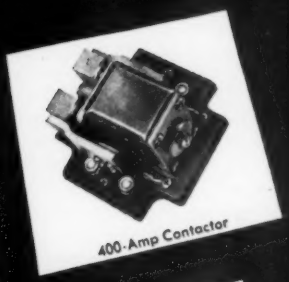
Overvoltage Relay

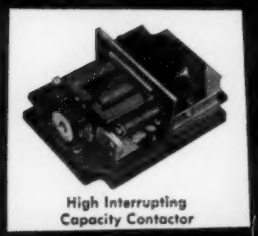

Fault Sensing and Generator Control

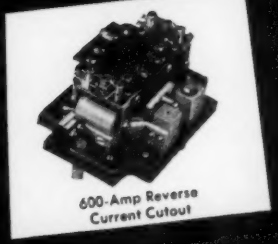

Jet Starter Relay

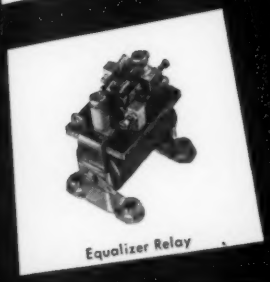

High Interrupting Capacity Cutout


Control Relay


400-Amp Contactor


High Interrupting Capacity Contactor


600-Amp Reverse Current Cutout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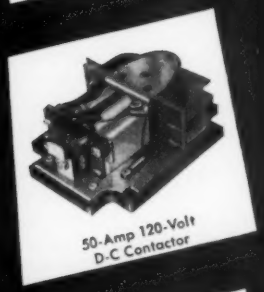
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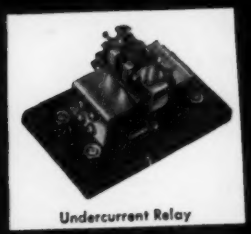
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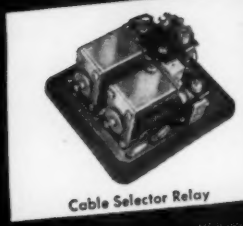
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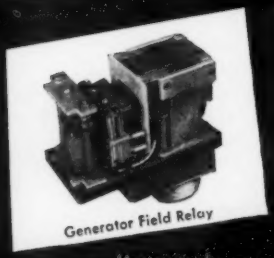
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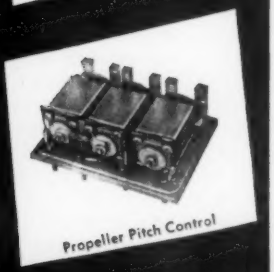
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Our Defense Program Faces a Crisis

A major crisis will soon confront our defense program.

It is not a crisis in raw materials. To find enough materials, from steel to cobalt, for defense production is a serious problem. But it is one that is being solved.

It is not a crisis in manpower. Shortages of workers with special skills hamper production, but these shortages are being relieved, slowly.

It is not a crisis in manufacturing capacity. American industry's record-breaking expansion is, with very few exceptions, keeping abreast of defense needs.

The coming crisis will be one of finance. It will rise from our failure to provide the means to PAY FOR the defense program we now have under way.

A $15 Billion Deficit?

Congress has approved a defense program which is scheduled to raise *total* federal spending in the year from June, 1952, to June, 1953, to somewhere between $85 and $90 billion. Additional appropriations for more air power and atomic development, which are now proposed, would add several billion dollars.

But Congress has not approved a tax plan to match such spending. With the new levies enacted in this session, tax collections during the 1952-53 fiscal year are estimated to fall somewhere between $70 and $75 billion. That would be roughly $15 billion short of balancing the budget. If the defense program is expanded, the deficit will be that much greater.

We have not yet felt the impact of the crisis that would accompany a federal deficit of this magnitude. Federal tax collections currently are big enough to balance federal expenditures. But the defense program is scheduled to boost the annual rate of federal expenditures $25 billion in the next year.

To Meet the Crisis

By January the crisis will be clearly in sight.

Then the President will present his budget. After that, Congress must act to close the broad gap between government income and government spending. If it fails to do that, the whole defense program will be menaced by weakness in its financial foundations. That weakness might well take the form of another destructive wave of inflation.

We have three ways to meet this crisis.

The best approach, of course, is to cut unessential expenditures. That can make a real dent in the deficit. The second is to collect more

taxes. The third, and by all odds the most dangerous, is to have the federal government meet its deficit by going deeper into debt. Borrowing, which might feed inflation, can easily lead to disaster.

Near Income Tax Limits

It will not be possible to raise taxes to meet the deficit merely by increasing further the rates on corporations and on persons in the upper income brackets. Congress has about scraped the bottom of that barrel.

The Senate Finance Committee said as much in reporting this year's tax bill. The Committee reported that it had "serious doubts as to the feasibility of raising any substantial additional amounts of revenue from income tax sources." The Committee observed that recent tax legislation brings the burdens of most corporate and individual income taxpayers close to the World War II peaks, and actually carries the rates paid by many taxpayers above those peaks.

Our ramshackle federal tax system must be thoroughly overhauled in order to broaden the tax base if it is to produce more revenue—without doing much more harm than good.

The shocking fact is that no one seems ready to act along any line that might enable us to surmount the crisis.

That fact of itself aggravates the coming crisis. And next year's presidential election doesn't make it any easier to move effectively. Both parties will shrink even more than normally from backing any program that might irritate any considerable number of voters.

If we are to meet this crisis on the tax front in an orderly way, the technical work should be in progress right now. To a large extent it is being ignored.

If we are to enforce the vitally essential program of government economy, there is the same urgent need to get under way the spade work that is required.

And if—as a last miserable expedient—we decide to let the federal government drift deeper into debt, it must have a well-developed program of borrowing from individuals and other investors, such as insurance companies, rather than from the commercial banks. Borrowing from commercial banks might speedily translate the deficit into more and more price inflation. No adequate program of borrowing from savings is now in sight.

Now Is the Time

It is possible, of course, that international relations may improve sufficiently to make it safe for us to slow down the rearmament program. If that should happen, the fiscal crisis would not be so critical. But that kind of good fortune has been notably absent in recent years.

Lenin, patron saint of Communism, is quoted to the effect that to destroy a political and social system such as ours "you must debauch its money."

We shall set democracy to digging its own grave if, through our preoccupation with politics during the presidential campaign, we pave the way for further debauchery of our money.

If we really want to avert that disaster, now is the time for us to get going.

Once the crisis is full upon us, it will be too late.

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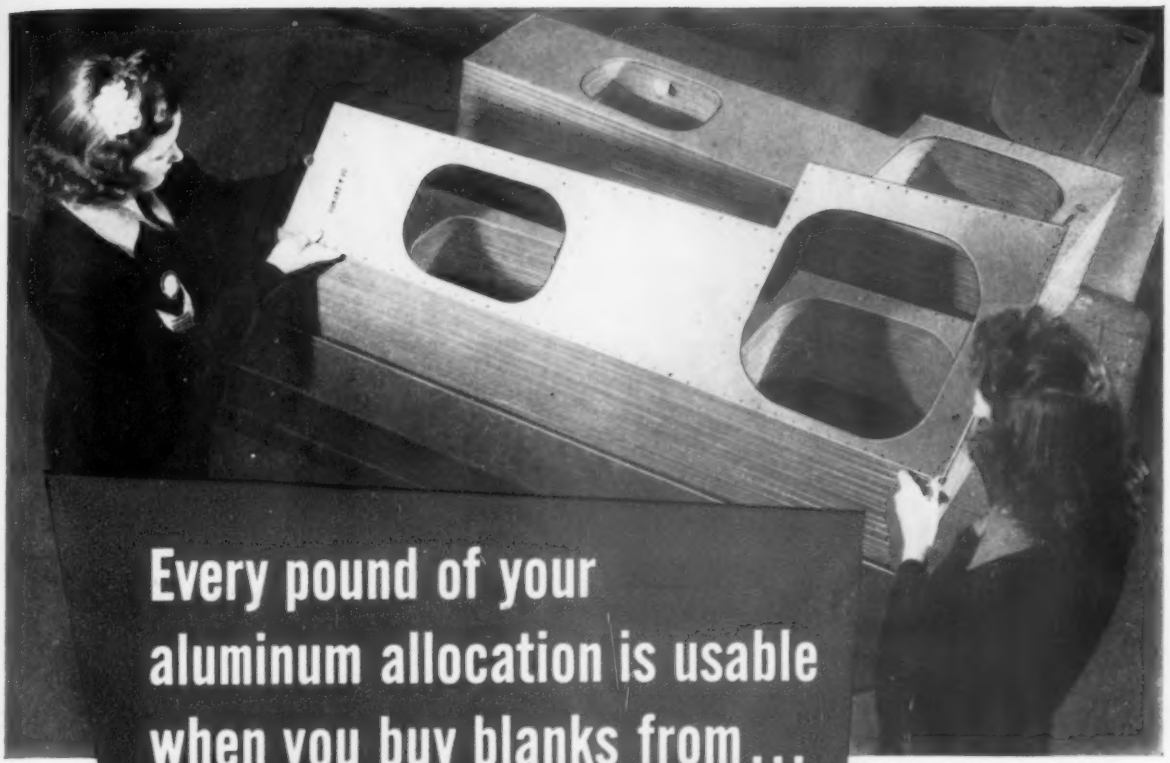

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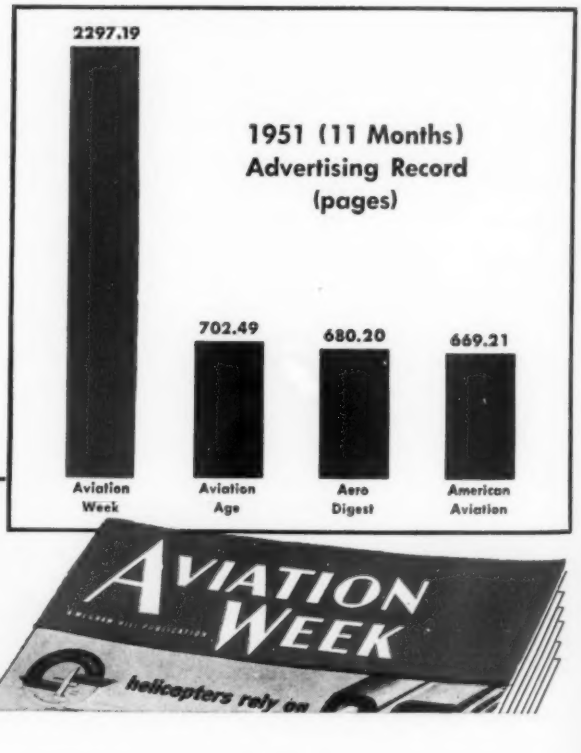

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FINANCIAL

Airlines Convert Preferred Shares

Rising earnings and favorable outlook provide proper atmosphere for switching senior equities to common.

Major improvement in the credit status of airline preferred shares is highlighted by the recent partial conversion of the United Air Lines senior equity.

In January, 1947, United sold a total of 94,773 shares of a 4½% convertible preferred issue to facilitate financing its expansion program.

Approximately $9.5 million was realized from the 1947 transaction. Originally convertible into common at the rate of four shares of common for each share of preferred, subsequent adjustments brought the conversion rate to 4.219 shares.

▶**Erratic Prices**—Issued at an indicated price of $105 per share, this United preferred has had erratic price fluctuations.

With the large postwar conversion losses of the company, there was a steady deterioration in the market quotations of the preferred. The low point —$57.50—was reached during the second half of 1948. This decline carried with it the fear that the company would omit payment of dividends on this security. But while earnings were lacking, United nevertheless maintained an unbroken dividend record on this stock throughout. This dividend record was of prime importance to the long-term credit standing of the company.

As the fortunes of the company improved, price of the senior equity rose steadily.

Last market quotations for the preferred were around $145 per share.

This, in turn, gives effect to the market price of the company's common stock.

▶**Financing Angle**—This illustrates why convertible preferred, as well as debentures, are sometimes used as a financing medium. The convertible preferred has a relatively senior position over the junior equity. Usually a stated dividend is mandatory when earnings exist. While enjoying this senior status the preferred also is in a position to participate in the future growth and earnings accruing to the company and reflected directly by the enhanced market stature of the common.

This financing medium is frequently applied by companies where a potential common stock issue is sold in the guise of a protected senior security. A "sweetening" process such as this makes such issues more palatable to the public, particularly true where the direct sale of a common stock issue would be extremely difficult or could only be accomplished at a substantial discount. The hope is to sell the convertible issue and ultimately have it converted into common when the company's earnings and outlook warrant the taking of such action.

This background explains the recently completed major conversion of the United preferred. Current reports indicate that about 50,000 out of the original 94,773 preferred shares issued have now been converted. Most of these conversions took place in recent weeks. United encouraged this action by giving preferred stockholders an added inducement. The senior stock received a quarterly dividend of $1.125 per share on Dec. 1, 1951.

▶**Conversion Inducements**—To those converting into common prior to Dec. 4th, the dividend was also offered of 75 cents per share payable to the common shareholders as of record on Dec. 4th. For each share of preferred converted, the conversion dividend is equivalent to $3.164. Further, with the 1951 common dividend rate of $1.50 per share for 1952, the preferred shareholders have an opportunity to receive $6.23 per share on the equivalent common received in exchange for one share of preferred which will return $4.50.

Should earnings decline, jeopardizing common dividend payments, the preferred's senior issue will remain more desirable.

Through this effected partial conversion, about 50,000 shares of preferred, United eliminated a fixed dividend claim of about $225,000 annually and removed a senior issue, in part, from its capital structure. Dilution of the common stock has also taken place, some 210,000 shares having been added to the more than 2,069,000 previously outstanding.

▶**Timid?**—The company's approach in effecting this partial conversion appears timid to some observers. United could, it is maintained, force conversion by calling the entire preferred at the stated per share redemption price of $105 now, or at $102.50 after Jan. 1, 1952. With the market around $135 per share, the preferred would have been forced into conversion. In this

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manner, the entire issue would have been eliminated.

For example, earlier this year, Capital Airlines had $2,728,500 principal amount in 4% convertible income debentures, Series B, outstanding. Convertible into 90 shares of common per $1,000 principal amount, a market premium existed for this obligation.

On Feb. 10, 1951, the company forced conversion by calling the debentures at the stated redemption price of 102½ per bond. As a result, virtually the entire issue was converted into common. (At present market, the 90 shares received per $1,000 debenture now have a price of around $1,450.)

By forcing conversion, Capital removed a senior obligation carrying with it definite interest charges. Not now on a dividend basis, Capital saved the entire interest outlay and greatly simplified its capital structure, although it diluted the common stock equity.

▶ **Other Possibilities**—There are other airline convertible preferred shares which may some day be liquidated through conversion into common stock.

• **American.** The largest issue is represented by American's 400,000 shares of $3.50 convertible preferred. This series was marketed in June, 1946 at $102 per share. After declining to a low of $47 in late 1948 tax trades, this issue also made a material recovery reflecting improvement in the company's fortunes. Recent quotations are around $91 per share.

American's preferred is convertible into common at $21 per share or about 4.6 shares of common for each share of preferred. With the common now selling at $16 per share and paying 50 cents per share in dividends during 1951, there is no motivating factor to encourage conversion of the preferred by its holders at this time. The annual dividend requirement is $1.4 million.

• **Northwest Airlines** is another carrier with an erratic convertible senior equity outstanding. In April, 1947, the company sold 360,000 shares of a 4.6% preference stock issue at $25 per share. In view of operating misfortunes which befell the company, dividends were on a number of occasions suspended on this stock. (All arrearages, however, have been made good by subsequent actions and this stock is now on a current basis.) During 1950, the Northwest preference sank to a low of 15⅛.

As the airline industry has made a good recovery, with Northwest participating, its preference shares have also reflected this improvement and were last quoted around $24 per share. Each share of the preference stock is convertible into 1½ shares of common.

• **Northeast.** The closest held convertible preferred among the airlines is that issued by Northeast. It was issued in 1948 to refund obligations due the Atlas Corp.

Of the original issue of 83,333 shares, Atlas Corp. received a total of 76,959 shares. During a long period, no dividends at all were paid on this preferred stock. Subsequently, all arrearages were paid with the issue now on a current basis.

Following adjustment, the conversion rate on this stock was 5⅛ common for each share of preferred. This was the rate up to Mar. 30, 1951. At that date, Atlas Corp. converted 30,000 shares into 182,750 shares of common, bringing its total holdings of the junior equity to 392,663 shares or 49.6% of the total outstanding. The current conversion rate of the Northeast preferred is now 5¼ shares of common for each preferred share. Subsequent conversions will be influenced almost entirely by questions of Atlas Corp. policy in respect to its interest in Northeast.

In all instances, a period of rising earnings and a favorable outlook provide the proper atmosphere for companies with convertible senior securities to improve their capital structures through conversion into common stock. That opportunity is rarely available when adverse conditions exist and when the weight of senior issues can prove to be a heavy burden.—**Selig Altschul**

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National Faces Delays in Colonial Merger

• It may take CAB a year to render a verdict.

• And values could change in favor of EAL by then.

By F. Lee Moore

Colonial and National Airlines directors have agreed to merger terms that look simple at first, but may turn out more complex.

Colonial has accepted National's bid of ⅞ share National stock for one Colonial. Colonial rejected an Eastern Air Lines bid of ½ share Eastern stock for one Colonial because the National deal offered a little more current book and market value to Colonial stockholders.

▶**To Step Down**—Colonial President Alfons Landa will step out of Colonial altogether if Civil Aeronautics Board approves the merger, sources close to Landa say. Landa is a Washington attorney—not an airline management man. He took over the temporary presidency of Colonial to revamp its finances after CAB ousted former President Sigmund Janas, Sr.

According to present plans, National Airlines President G. T. Baker would thus take over the Colonial routes, equipment and personnel—add them to the National system—and integrate. He would thus command a significantly-expanded National airlines, stretching from Montreal, Canada, to Havana, Cuba.

From the immediate viewpoint of both the Colonial stockholders and the U. S. taxpayer, who has been footing the bill for Colonial's high subsidy, this merger makes sense, observers say.

But a CAB official warns that the merging parties face potential problems in attempting execution of the plan; among the problems he sees are:

• **Delay of CAB approval** could last a year or more.

• **Values could change** so much during the possible CAB delay that either party might lose interest in the Colonial-National agreement and CAB might conceivably be influenced to prefer another.

• **National is paying** the price of taking several loss-operations routes for Colonial's best-paying route—New York-Montreal.

• **Employe Seniority integration** may pose personnel problems because National's employes are relatively new and young because of the company's mushroom growth since World War II.

PRINCIPAL officers in proposed merger of Colonial with National Airlines are G. T. Baker (left), NAL president, and temporary Colonial chief, Alfons Landa (right). Landa took over Colonial from ousted President Sigmund Janas, Sr., to revamp its finances.

▶**The Agreement**—All that's been officially revealed by the Colonial and National managements is the company directors' agreement that National will give ⅞ share National stock for one Colonial share.

Here's why Colonial favored that over Eastern's bid: In terms of book value, as of June 30 this year, National bid $7.73½ per share Colonial stock, compared to Eastern's bid of $7.59½ book value.

In terms of market values as of Nov. 24—two weeks before the agreement's signing—National bid $13.12½ per share Colonial stock, compared to Eastern's bid of $12.50 market value. Since the Colonial directors figured it's impossible to forecast the distant future, they accepted National's bid based on its current advantages, according to Colonial President Alfons Landa.

As of Nov. 24 (the pre-signature date of market value used above), Colonial stock closed at $8 a share market value; this made National's bid of $13⅛ relative market value attractive.

▶**CAB Outlook**—Colonial and National say they plan to file their agreement soon. CAB Examiner Edward T. Stodola says he plans to consolidate their application with his New England-Southern States merger investigation.

He has tentatively slated the exhibits deadline for Jan. 31 and his examiner's hearing for April 14. He says he does not see why consolidation of the Colonial-National merger application with this case should substantially delay CAB decision on the application.

A top CAB official says the Board may decide to expedite the Colonial-National part of the case. It could ask Examiner Stodola to render a supplementary early recommendation.

▶**What National Gets**—First of all, if it buys Colonial, National gets four DC-4s and eight DC-3s. It also gains a larger north-south system on which to utilize investment and personnel.

In buying Colonial's routes, National would acquire the definite asset of a new through-traffic nearest for both systems. It also gains Colonial's New York-Montreal route—a logical extension of National's own New York-Deep South system.

And National gets a potential asset in Colonial's New York-Bermuda route; but that is hotly competitive with British Overseas Airways and Pan American.

Presently on the debit side of National route acquisitions with Colonial are its service to Ottawa and western Pennsylvania and New York. These Colonial points are potentially good traffic points for the local service lines that serve them, but their market is for service to New York; Colonial's routes through these western New York and Pennsylvania towns are between Washington and Canada, not New York, a CAB official pointed out.

Trunkline Coaches Are Running Full

	LOAD FACTOR (Third quarter, 1951)	REVENUE PASSENGER MILES (000 omitted)
American	89%	56,700 mi.
Capital	70%	33,700
Delta	73%	9,400
Eastern	72%	64,700
National[1]	58%	15,500
Northwest	82%	41,500
Trans World	88%	75,000
United	84%	25,500
Western	81%	16,400
ALL COACHES	79%	338,400

[1] National's Miami coach load is low in summer season. Winter gain is seen in September-November trend on N. Y.-Miami night and day coach load factors: September night, 50%; day 70%; October night, 54%; day 76%; November night, 60%; day 85%.

Crash, Competition Hit Nonskeds

Scheduled carriers cut fares, then a nonsked accident kills 56. Result: better sales talk for skeds.

A plane crash dealt a second stunning blow last week to the nonsked airlines' struggle for the mass transportation market, shortly after the scheduled carriers announced fare cuts to get a bigger share of the air coach business.

A Miami Airlines C-46 fell in a thickly populated area near New York City, causing 56 deaths to passengers and crew. Initial public reaction focused sharply on nonsked air coach safety questions, but observers expected the long-range effect to be economic.

The plane crashed in Elizabeth, N. J., a few moments after takeoff from nearby Newark Airport.

The accident occurred Dec. 16. Morning takeoff of the Miami-bound plane was delayed by heater difficulty and the twin-engine Curtiss Commando started its flight in mid-afternoon. Watchers reported the craft appeared to become airborne with difficulty and that smoke trailed from the right side.

▶ **Brake Trouble**—Early unofficial reports indicated fire in the right brake. Immediately after takeoff, the pilot was told by the tower to lower his gear because his right brake was smoking. Witnesses said the wheels stayed up and the right engine appeared to be afire.

Official determination of the cause awaited investigations by several official groups under leadership of Civil Aeronautics Board safety experts.

▶ **Leased From AF**—Over Elizabeth, the plane appeared to be losing parts—one was found about three miles from the crash scene—and an instant later it was down at the edge of the shallow, narrow Elizabeth River, with no survivors.

The plane was powered with two Pratt & Whitney R-2800s, and had been leased by the carrier from Air Force surplus two years ago.

While the accident was the second in total number of fatalities in U. S. domestic airline history, it was the first nonsked fatal passenger crash in common carriage operation since July 19, 1949.

▶ **Safety Records**—The nonskeds were in their 29th consecutive month of noncharter domestic passenger flying without a fatality when the mishap occurred. Other fatal accidents have occurred on charter flights—one when a plane loaded with laborers from Puerto Rico crashed, killing 28; another when one died near Tucumcari, N. M. The former was in 1950, the latter last month.

Thus, after the Elizabeth accident, passenger and crew fatalities on nonsked airlines for 1951 stood at 57. The nonsked safety record exceeded that of the scheduled carriers, on whose lines, domestic and foreign, 207 had been killed since the first of the year.

▶ **Fatality Rates**—Unofficial CAB estimates, however, put the overall comparative U. S. passenger fatality rate per 100 million passenger miles (charter and common carriage on domestic and overseas operation) at 1.5 for the scheduled lines and 5.2 for the nonscheduled for 1951. This compares with 1.3 and 3.7, respectively, for 1950.

The rate on domestic nonsked common carriage has not been computed separately.

The rate is higher for nonsked operations because they fly fewer passenger miles than the scheduled airlines. The larger number of passenger miles flown by the scheduled carriers reduce their fatality rate, even though their total fatalities is greater.

It was on a scheduled airline that the most fatalities occurred in any single accident. Fifty-eight persons were killed when a Northwest Air Lines DC-4 enroute from Minneapolis to New York went down in Lake Michigan.

▶ **Consequences**—Despite the nonsked safety showing, the Elizabeth crash was expected to have far-reaching economic consequences.

Some of them were felt immediately. A New York ticketing agency for nonsked lines reported that in the two days after the Miami Airlines crash it had experienced a drop of about 40% in ticket sales. The effect was particularly noticeable during the usually heavy holiday season.

Many prospective passengers, the agency said, anxiously asked in what type of plane they would fly. An agency spokesman commented that "there always was a resistance to flying twin-engine, but nothing like this."

▶ **No ACTA Comment**—The Elizabeth accident came at a significant time shortly after CAB urged the regular airlines to go into the air travel mass market. The CAB action took the nonskeds by surprise. They haven't decided what tack to take, and even the usually outspoken Air Coach Transport Assn. has remained unusually silent.

ACTA's only comment last week—third full week since the CAB move—was that "we're considering a protest." An ACTA spokesman said the association hadn't decided how to aim its protest. One angle the organization's policy planners said they were considering was to challenge the 3½-cent rate proposed by some regular airlines as "below cost and a shallowly disguised move to use government subsidy to drive the nonskeds out of business."

There was one major development dollarwise in the contest between the skeds and nonskeds for mass air transportation.

Senate Comment

The weekly staff report of the Senate Small Business Committee headlines its comment on the Civil Aeronautics Board coach expansion policy:

"Scheduled airlines open fare war against small airlines following a request from the Civil Aeronautics Board to aid in the fight against the nonscheduled airlines."

▶**AA in Race**—American Airlines announced it will meet TWA's price slash from $110 to $99 for transcontinental air coach service; and American will double its coach service next spring, expanding it more thereafter as equipment permits.

But one leading transcontinental nonsked airline says it is not worried about the regular airline invasion of the nonsked market now.

"They aren't going to expand enough next year to bother us at all," a spokesman said.

"The nonskeds won't have to worry until the regular airlines' coaches are running coach load factors of 70% or less. Then they'll be providing real coach service on demand. Right now their coaches are so full you can't get a reservation for days, and we nonskeds are running extra sections like mad."

▶**All-out Expansion**—But he added that by 1953, when the regular airlines may have plenty of new equipment, the situation may change.

The move on fares by American, leading domestic airline, came in the third week after CAB announced it would push all-out air coach expansion and fare-reduction by the regular airlines. But AA had planned its coach expansion before CAB urged it.

▶**To Use DC-6**—American's transcontinental coach will feature the usual 70-passenger DC-6 service in competition with TWA's 80-passenger Constellations.

But United Air Lines has gone them one better on price, though not on service, by meeting the nonsked airline DC-4 transcontinental fare of $88 westbound, $99 eastbound, and United will charge $24 between New York and Chicago, compared with $32 for TWA and American. However, United's coach DC-4 takes an hour longer than the AA and TWA service New York-Chicago. Eastbound, United offers a considerably slower transcontinental service at the same price—$99.

United says, "we will watch the experiment closely and eventually will either abolish or expand the low-cost service, depending on economic results."

United's only transcontinental coach —a San Francisco-New York DC-4— has done badly by comparison with experience of the other eight trunklines now operating coach (see table). It has averaged a 50% load September-November, its first three months.

Sked and Nonsked

Following list shows fatalities during passenger flights in U. S. domestic common carrier operation since Jan. 1, 1950.

Scheduled Carriers

Mar. 3, 1950—Northwest Airlines 2-0-2, Minneapolis, 13 fatalities.

June 23—Northwest Airlines DC-4, Benton Harbor, Mich., 58 fatalities.

Sept. 4—Robinson Airlines DC-3, Utica, N. Y., 16 fatalities.

Nov. 7—Northwest Airlines 2-0-2, Butte, Mont., 22 fatalities.

Jan. 14, 1951—National Airlines DC-4, Philadelphia, six fatalities.

Jan. 16—Northwest Airlines 2-0-2, Reardon, Wash., ten fatalities.

Mar. 2—Mid-Continent Airlines DC-3, Sioux City, Ia., 15 fatalities.

Apr. 6—Southwest Airlines DC-3, Santa Barbara, Calif., 22 fatalities.

Apr. 28—United Air Lines DC-3, Ft. Wayne, Ind., 11 fatalities.

June 30—United Air Lines DC-6, Ft. Collins, Colo., 50 fatalities.

Aug. 24—United Air Lines DC-6B, Oakland, Calif., 50 fatalities.

Nonscheduled Carriers

Dec. 16—Miami Airlines C-46, Elizabeth, N. J., 56 fatalities.

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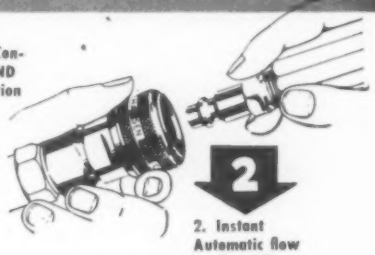

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Tools for Pilot

● He does a good job with equipment available to him.

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Three main equipments are needed to improve instrument approach for bad-weather landings:

• **Automatic approach coupler** with automatic pilot.

• **High-intensity lighting** of approach and runway, in "adequate" layout.

• **Weather measurement devices** and improved techniques to describe approach conditions accurately.

Today's airline pilot is not getting adequate equipment to make reasonably sure approaches, even at currently authorized weather minimums.

That's the way Sperry Gyroscope's chief test pilot Robert B. Roe sees it. He presented these ideas at the Wings Club's December luncheon in New York as the considered opinion of his company. He said the conclusion is drawn from ten years development work and over 100 actual bad-weather landings with test equipment the last two years.

The goal of airlines and CAA the next several years should not be any lowering of the current minimum, Roe declared. It "should be to improve the over-all approach performance such that the expected number of misses at a minimum of 200 ft. and half-mile is 3% instead of 33%."

Roe outlined present approach performance: When the terminal weather is reported as ceiling 400 ft. and visibility 1 mi. (day or night), one out of ten first approach attempts results in a missed approach. At 300 ft. and ¾ mi., a widely used airline minimum for straight-in ILS approaches, the misses rise to 1 out of 4 or 1 out of 5 first attempts. "This illustrates the critical nature of the approach problem as we know it today."

► **On Safety**—At the lowest minimum now authorized by the CAA for ILS operation (200 ft. and half-mi. visibility) 1 out of 3 approaches miss the first try. The average airline pilot only lands in 200 ft. ceiling and half-mile visibility conditions about once a year, Roe said.

Then Roe made a Sperry statement that could set the CAA and some airlines thinking about putting more money into certain equipment installations and their utilization—relative to pilot training step-up, now the number one safety program of CAA and the airlines:

"This record is no reflection on the professional ability of the airline pilot, for he is doing the best possible job with the tools at hand. It does, however, graphically demonstrate the inadequacy of his tools."

To better this record of missed approaches under currently authorized minimums, Roe tallied the three main equipment needs mentioned before: automatic approach, ground lighting and weather measuring devices.

► **Long Way Off**—As to automatic or "blind" landing, Roe said there is no such thing today—even experimentally: the pilot always had to see to land and furthermore the pilot always landed manually taking over from the automatic or zero reader equipment just prior to contact . . . . reliable automatic landing is a long way off."

With CAA cooperation Sperry has made and documented on film over 100 approaches in the New York area with weather conditions worse than present airline minimums, but using only standard equipment available to airlines. Average condition was 100 ft. ceiling and quarter-mile visibility. Worst condition encountered in two years of experimental operation was ceiling zero and visibility 80 yards.

Other Wings Club speeches, all on the subject of air traffic control:

• **Radar control.** Sam Saint, American Airlines pilot on loan to Air Transport Assn., said "the white hope" for improved terminal traffic control is radar, now being implemented by stages at Washington National Airport. Big problem is the increasing traffic: If instrument approach traffic doubles, the difficulty of traffic control multiplies six or eight times, Saint said.

So there's going to be a saturation point. Saint lauded the working-level cooperation of CAA, the airlines, the pilots and all others in working out the new traffic control system.

Last of the Night Hawks

Competition from airlines fortunate enough to have nonstop coach routes has killed off the original U. S. domestic scheduled air coach flight. American, TWA and finally United, have driven Capital's famous Night Hawk flight from the New York-Chicago market.

The old Night Hawk, first domestic coach, born November of 1948, died last month. Here's how it happened:

When Capital started the flight three years ago, it paid off because of low price and good promotion, even though Capital had never before been a major factor in the New York-Chicago market.

Then the Civil Aeronautics Board stepped in and required Capital to make the coach stop at both Pittsburgh and Detroit, en route between New York and Chicago. And American and TWA began promoting their superior nonstop coach service with DC-6 and Constellation vs. Capital's DC-4 with two stops.

Even so, the old Night Hawk kept flying, and making money. But New York-Chicago business was falling off.

Finally, the CAB induced United Air Lines to come into the New York-Chicago coach market. Capital promotion efforts couldn't combat this trend. What's more, Capital's other coach and first-class flights already were doing such good business Capital needed more planes than it had.

This October, Capital's New York-Chicago coach load factor dropped to only 55% of capacity—close to the break-even point. That compared with a 70% load in October, 1949, before CAB imposed the two-stop restriction on the flight. So Capital dropped out of the New York-Chicago coach market, and the old Night Hawk equipment is now on better Capital routes, like Washington-Chicago.

Avianca Releases Merger Figures

(*McGraw-Hill World News*)

Bogota—The results of the Avianca-Lansa merger have just been made known by Avianca. The total monthly flight time of the two companies has been reduced by about 800 hours or 10% under average of the first six months of the year.

The joint companies now own a combined fleet of 58 aircraft, 42 of which are operated as Avianca and 16 as Lansa. The Avianca equipment includes eight C-54s (6-passenger) and two new L-749A Constellations. Seventeen of the aircraft are freighters.

The combined traffic figures of Avianca and Lansa for the first half of this year indicate that the two companies accounted for something better than 90% of the total passenger movement in Colombia and approximately 60% of the cargo business.

The figures for the two companies

during the first six months of 1951: 394,766 passengers, 264,552,166 seat kilometers flown, 146,678,240 revenue passenger kilometers and 44,673,614 revenue ton kilometers. Hours flown amounted to 47,196, kilometers flown to 11,645,780. Freight and express carried came up to 36,392.7 tons and gross revenues amounted to over $10 million.

BOAC May Fly First Jet Carriers in U.S.

British Overseas Airways may be the first airline to operate jet transports transcontinentally in the U. S., but only on its proposed round-the-world routes.

The British won the right to fly across the U. S. on their world-wide routes under the Bermuda Agreement of 1946. However, by international agreement, a foreign airline cannot pick up a passenger in the U. S. and transport him to another city in this country. That is cabotage, which is forbidden in most countries.

▸**Service in 1953**—When BOAC gets its Avon-powered Comets operating, one of two round-the-world routes planned will be London-Gander-New York-Tulsa-San Francisco-Honolulu-Sydney-Singapore. It expects to operate Ghost-powered Comets from Singapore to London.

Present schedules call for inaugurating jet transport service New York-Bermuda and New York-Nassau by March, 1953. But the long-range routes must await delivery and break-in of the Avon-powered Comets, expected in 1955.

Other routes BOAC may serve if it chooses include New York to New Orleans and Mexico City, and New York to Cuba, Jamaica, Panama, Columbia, Ecuador, Lima and Santiago.

▸**Jet Schedules**—Here is the BOAC route development schedule for the Ghost-powered Comet:

- **April, 1952**—London-Rome-Cairo.
- **May, 1952** – Khartoum-Entebbe (Uganda)-Livingstone (B. C.)-Johannesburg.
- **Late 1952**—Cairo-Basra or Bahrein-Karachi-Calcutta-Bankok-Singapore.
- **March, 1953** – New York-Bermuda and New York-Nassau.

BOAC's long-range plans for world-wide turbine-powered transport call for jet Comets on fast, full-fare service and turboprop Bristol 175s for air coach service. Large-scale delivery on both Comets and Bristols is scheduled about 1955.

No American airline is known to have ordered U. S.-designed jet or turboprop transports, and efforts of one U. S. operator to buy Comets for transcontinental use were blocked (AVIATION WEEK Nov. 26, p.14).

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SHORTLINES

► **Air Transport Assn.** reports a 35% gain in interline traffic business cleared in October over a year ago—$27,752,196.

► **All-American Airways** mechanics have started a mechanics safety committee. "First time in the airline industry," says CAA safety agent Charles H. Knobler. . . . Hasn't had a fatal accident in three years passenger service.

► **Brazil** airline workers had been on strike a week as of last week, grounding all night flights of PAA and others. Airlines are able to operate some day flights.

► **British-European Airways** has re-organized its management system on functional instead of regional lines. Company now has seven main departments: commercial, traffic, flight operations, schedules, engineering, finance and administrative.

► **British Overseas Airways** has contracted its Constellation coach conversion work to Lockheed Aircraft Service, Inc. . . . Will carry 68 passengers each in Connies, compared with about 60 for other trans-Atlantic airlines.

► **Canada** and the U. S. have now extended pre-flight immigration inspection to customs, greatly simplifying passenger dispatch and improving airline appeal.

► **Capital Airlines** expects slight delay on delivery of its two KLM Constellations set for Feb. 1 and Mar. 1. KLM has the conversion kits and specifications for modifying to Capital requirements, but did not start conversion as scheduled last week. Capital will get five more KLM Constellations in early 1953. All will be "plush" first-class interior design, according to present plans . . . Is converting a cargo DC-4 to first-class passenger seating; it should start passenger operation of the plane this week.

► **Central Airlines** has a CAB show-cause order raising temporary mail pay to 80 cents a mile from Oct. 1, 1951 to Apr. 30 next year and 65 cents thereafter.

► **California Central Airlines** traffic in November gained 14% over the month before. Both months have been new Cal Central records. Jan.-Nov. traffic is 41% over a year ago, and apparently still climbing, partly because of introduction of Martin 2-0-2s. Los Angeles-San Francisco load factor is 82%.

► **Civil Aeronautics Administration** regulations are serving as the model for Greece and Ecuador—preparing new regs.

► **Eastern Air Lines** started scheduled New York-Miami service with its first Lockheed Super Constellation. Eastern version seats 88 passengers on first-class service. Eastern has 30 on order. . . . Is delaying part of its publicity campaign on Martin 4-0-4 introduction, due to delayed deliveries. Of 60 Martins on order, Eastern had only five on hand last week, hopes to have about 12 by the end of the month; but still plans to start scheduled 4-0-4 service next month.

► **El Al Israel national airline** has signed a one-year contract for Lockheed Aircraft Service, Inc., to do its maintenance at N. Y. International Airport. Cost is estimated at $500,000 to $1 million a year.

► **Mid-Continent Airlines** and Eastern plan to start one-plane service Kansas City-Miami on Jan. 10. . . . Has speeded engine change operation using the 6,000 lb. Ross model 6-P fork lift truck, designed especially for the job.

► **National Airlines** has set up an "Air Coach division" as distinct from regular "Star" service. . . on its proposed $43 New York-Miami coach fare—equal to about 3¼ cents a passenger mile—70-passenger DC-4s will operate nonstop, day and night, if CAB approves the National plan, effective Feb. 1. Present coach rate is $53 and leaves only at night.

► **Northwest Airlines** says it has delayed Stratocruiser service to the Orient because the equipment is needed on the domestic routes. . . . Has cut bank loans from $17 million the first of the year to a current $13 million. . . . Estimates full year load factor at 64%, with 80% on some Stratocruiser runs. . . . Has hired seven interpreters to help the domestic sales staff handle Oriental passenger services and reservations.

► **Ozark Air Lines** revenue passengers carried last week of September and October totaled five times same period a year ago—first full month of the new local's operation. Operating revenue same period increased from $43,260 to $236,457 while operating expense gained from $85,584 to $210,537. Unit costs decreased from $2.16 a mi. to 95 cents.

► **Pan American World Airways** is

training Military Air Transport Service ground officers in cargo operations.

▸**Philippine Air Lines** has elected Philippine Defense Secretary Ramon Magsaysay as chairman of the board. He succeeds Justice Jose P. Bengzon, who resigned to run in the national elections, as did three other PAL board members. Other changes: Labor Secretary Jose Figueras succeeds Finance Secretary Pio Pedrosa; Health Undersecretary Regino Padua succeeds Sergio Osmena, Jr.; and Ludovico Mapa succeeds RFC Chairman Placido Mapa. All represent the Philippine Government, owner of 52% of PAL stock. . . . Line made Trans-Canada Air Lines its general sales agent in Belgium, France, Luxembourg, Netherlands and Denmark. Paris office will control the Northern Europe sales territory. . . . PAL will increase airmail schedules to four flights a week to the U.S., following a new postal agreement.

▸**TPA Aloha Airline** family fare plan has been adopted by the new Japan Airlines, TPA reports. The two airlines have similar inter-island service problems.

▸**Trans World Airlines** has started a long-range training program on the Super Constellation for 350 TWA flight engineers. . . . Reports the Irish Tourist Bureau forecasts American travel to Ireland will jump 150% next year due to the May 1 start of trans-Atlantic air coach. . . . President Ralph Damon estimates TWA will carry a record 135,000 passengers on its international routes this year.

▸**United Air Lines** flew 157,750,000 revenue passenger miles in November, 34% over a year ago, but off seasonally by 11% from October. . . . Estimates full-year operating expense per revenue ton mile of 44½ cents, compared with 45.7 cents in 1950 and 50.3 cents in 1949. . . . Estimates also that in 1951 it will have carried 3 million passengers, a gain of 17% over 1950, with revenue passenger miles up 26% to 1,879,245,000. . . . Has received eight of the 22 DC-6Bs ordered for delivery up to 1953. . . . Expects the first of its 40 Convair 340s on order to be delivered this late winter or early spring. . . . United's transcontinental DC-4 air coach has run at a poor load factor the first two months of operation: October, 42% eastbound, 62% west, 52% average; November, 40% east, 61% west, average 51%.

▸**U.S. Airlines** has started non-stop freight service New York-Miami this month, leaving Idlewild midnights except Sunday. Time is six hours.

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42	SF5RN-12 (manufacturer's part No. 10-26170-1)	Bendix Scintilla Magneto
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29	PR48-A2	Stromberg carburetor
31	PR48-A3	Stromberg carburetor

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130	8288	Follower Ass'y
814	35814	Blower Ass'y
30	48346	Cylinder
53	48362	Shaft
175	48363	Shaft
56	48392	Sump
390	48461	Gear
78	76236	Gear
1178	84289	Bearing
113	84487	Housing
77	84591C	Nose Housing
200	48350-D	Crankcase Ass'y
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100	84084	Cylinder
200	84085	Cylinder

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17000	BC5W11
28000	KS6A
34600	NR6L12
7000	38KD4
6600	RE3MR3
5000	F35-14

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161	420 EC
160	420 DY
26	550 CD
14	550 CG
195	550 CP
104	550 EC

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Quantity	Part No.	Mfg.	Description
45	AN4103-2	Clifford	Brass (Valve # U4785)
38	18597-2	Airesearch	Aluminum (Width 8") (Length 9")

PUMPS

230	MF9-713-15A	Vickers	Hydraulic
75	AN6102-1(8818-2)	Adel	Fuel
160	2E492E	Pesco	Fuel
700	TFD 8600	Thompson	Fuel Booster
125	D7818	Adel	Anti-icer
170	2P771-A	Pesco	Fuel Booster
250	AN4014	Erie Meter	Wobble (D-3)
300	1H260-K & KA	Pesco	Hydraulic

INSTRUMENTS

19	AN5531-1	G. E.	Tach. Generator
1000	AN5780-2	G. E.	Wheel & Flap Position Indicator
400	AN5780-2	Weston	Same as above
1000	AW2-65B	U. S. Gauge	Air Pressure Gauge
16	76B19	Lewis Eng.	Cyl. Head Temp.
10	46B2	Lewis Eng.	Air Temp. Ind.
31	47B21	Lewis Eng.	Temperature Ind.
12	47B22	Lewis Eng.	Temperature Ind.
20	47B23	Lewis Eng.	Temperature Ind.
36	47B24	Lewis Eng.	Temperature Ind.
10	76Z2	Lewis Eng.	Air Temp. Ind.
11	76B4	Lewis Eng.	Temperature Ind.
20	77C4	Lewis Eng.	Temperature Ind.
21	77C5	Lewis Eng.	Temperature Ind.
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88	727TY73Z2	Weston	Right Wing Anti-icing
83	727TY74Z2	Weston	Tail Anti-icing
11	2227-11D-3A	Eclipse	Dual Tachometer
22	8DJ-29-AAY	G. E.	Indicator (Cowl Flap)
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47	FD65-6	Diehl	Motor
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80	AN3213-1	Scintilla	Ignition Switch
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90	JH950-R	Jack & Heintz	Starter Motor
492	S-841 (94-32253)	Electronic Labs	Box
53	AN6203-3	Bendix	Accumulator 10"-1500 P.S.I.
1000	13018-A	Bendix	Interphone Box
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188	EYLC-2334	Barber-Colman	Control
11	12086-1C	Eclipse	Amplifier
174	450-0	Skinner	Gasoline Filter
250	558-1A	Eclipse	Oil Separator
100	564-2A	Eclipse	Oil Separator
100	716-3A	Eclipse	Generator (NEA-3A)
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89	318	Edwards	Horn
280	921-B	Stewart-Warner	Heater (200000 BTU)
340	981280	Kidde	Co2 Cylinder
85	12924-2	Adel	Lock Valve
90	923748	Kidde	Oxygen Cylinder
80	DW28	Eclipse	Transformer
97	6041H-146A	Cutler Hammer	Relay (B-12)
22	0655-D	Aro	Oxygen Regulator
22	M-2031	Air Associates	Actuator
148	PG208AS1	Minn. Honeywell	Air Ram Switch
33	DW47	Eclipse	Transformer
11	DW33	Eclipse	Transformer
65	ASDC2	CO2 Mfg. Co.	Fire Detector
750	ND21	American Gas Accumulator Co.	Time Delay Relay
30	U6005-DV5	United Air Prod.	Oil Temp. Reg. 5°
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14	UA6009-S-30	United Air Prod.	Oil Temp. Reg. 9°
11	UA-6012K-S30K	United Air Prod.	Oil Temp. Reg. 12°

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Fire Prevention

Some recent fires, though not publicized, have caused anxiety among airlines and their pilots. A suggestion made to this author by American Airlines' Captain R. S. Green seems worthy of note. It concerns engine oil, which is usually changed only at overhaul.

In a gasoline engine it is a natural process for the oil to become saturated with gasoline after the engine has run for some time. Trucking companies, for instance, sometimes find used engine oil suitable for oil burner consumption because of this dilution. This mixing may also occur on airplanes to the extent of materially changing the flash point of the oil. If this oil-gas mixture comes in contact with hot parts of the engine the chance of combustion is increased.

The suggestion is that a check be made on engine oil, say every 200 hours, to determine whether the flash point is changed. Seconds are precious when a fire occurs in flight; clean oil could be a deciding factor.

Progress Report on ALPA

Clarence Sayen assumed the presidency of ALPA in mid-July. Within four months, pilot contracts were signed with practically all major domestic airlines. Some of these were more than two years overdue. American's is the latest contract. Before that it was United, C&S, TWA, Capital and Eastern. In between, many smaller agreements were also put into effect. Regardless of other considerations this is a good record.

Major agreement still to be reached in ALPA is: How to get rid of David L. Behncke, who, at this writing, is appearing daily in his old office pending the outcome of his lawsuit in Chicago courts.

Latest move by ALPA is a ballot to all members requesting a vote on the Behncke issue. The original vote to oust him was highly in favor of the move. In view of recent happenings sentiment now appears 100% for Sayen.

Passenger Authors

Many airlines encourage the practice of passengers writing letters to the president. This gives people a chance to air their gripes and make suggestions for improved service.

Some letters are pure complaints, some are worthy of consideration. Many however, in all innocence, are fantastically funny. In these the passenger usually fancies himself an expert in the operation of airline planes and mentally awards himself a medal for reporting some breach of regulations (as he thinks) to the front office.

On a recent flight to New York the crew let down to their assigned altitude and performed the cockpit check prior to landing. This included dropping gear and flaps and increasing propeller rpm. A landing on LaGuardia's short runway resulted in using normal reverse pitch for braking.

All this the passenger noted, though his reasoning was different. His letter to the president gleefully proclaimed that the pilot couldn't find the airport at first. In fact the plane was so low over Brooklyn that the pilot had to increase power to clear the buildings (increasing rpm., obviously). Then, on landing, the pilot was going so fast that he had to put his engine in reverse in order to stop on the field! The usual suggestion about keeping a better eye on the pilots was also included.

WHAT'S NEW

New Books

PB 104 604, Plastic Deformation of Crystalline Solids. Order from Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. with check or money order payable to Treasurer of the United States. $3.50.

This publication is a summary of a symposium on the subject which was sponsored jointly by the Office of Naval Research and the Carnegie Institute of Technology. Nineteen papers by authorities in special fields of plastic deformation of crystalline materials are presented in the book.

If the atomic arrangements within crystals are known, and if the forces needed to push individual atoms out of these arrangements are known, then stronger crystalline materials, especially metals, can be formed.

In fact, says the publication, if research continues at the present rate, most of the basic phenomena of plastic deformation will be understood within five or ten years.

Thus in a decade or so, engineers will be able to design the kind of metal needed by working out in advance the arrangement of atoms required within the metal crystals.—DAA

Telling the Market

How to Operate a National Welding or Cutting Outfit is a well-illustrated booklet aimed at the trainee level. It can be obtained from National Welding Equipment Co., 218 Fremont St., San Francisco 5. . . . Actual performance records in machining metals with the aid of cutting oils are contained in a 32-page booklet, **Getting Down to Cases on Metal Cutting,** compiled by E. F. Houghton & Co., makers of metalworking and heat treating products. Machine feeds and speeds, types of machines, grades of steel and dilutions of cutting fluid are given. Write the firm at 303 W Lehigh Ave., Philadelphia 33.

Ryerson Aircraft Steels booklet, which includes revised military specifications up to Aug. 1, 1951, has been reprinted and is available from the Joseph T. Ryerson & Son, Inc., at nearest sales office or by addressing the firm at 16th & Rockwell St., Zox 8000-A, Chicago 80.

Publications Received

•**ASTM Standards on Petroleum Products & Lubricants,** by ASTM Committee D-2, published by American Society for Testing Materials, 1916 Race St., Philadelphia, September. 1951.

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LETTERS

Air Support

After reading "New Facts on Jet Combat Worry Allies" in the Dec. 3 issue of AVIATION WEEK I feel compelled to ask a few questions and make a few statements.

A. W. Jessup states that Lt. Gen. E. M. Almond, CG X Corps, bitterly denounced the AF and refused to enter into air-ground cooperation in several ways. But . . . an article on page 7, Dec. 1 issue of AF Times states that during the month of September, the X Corps received five times as many close support sorties as any other Corps on the line, with the famed First Marine Division receiving 40% of the sorties flown in support of the five divisions of the X Corps. This seems to indicate that the X Corps is getting much more than their share of air support despite the fact that their C. G. denounces air power. Is this inter-service cooperation?

It would seem that the Department of Defense should enforce a little inter-service cooperation if the U. S. is to get their full money's worth out of their defense dollar, and the full combat efficiency out of the respective forces with the least loss of life.

As a bombardier-navigator on a B-26, I flew 75 combat missions over Korea and had a chance to observe both the interdiction and close support phases of the air war there. Several of my close friends served as forward air controllers and tactical air controllers with various army units and gave me their impressions of the close support picture as the infantry man sees it.

In Korea, close air support is fast taking over the job formerly handled by artillery. It seems that the general trend is to call for air support and if it is not immediately available then call for artillery. In spite of the mountainous Korean terrain close air support by fighter-bombers and light bombers has been devastatingly effective. The Marines were sold on air support in the Chosin Reservoir engagements and according to the article in AF Times are asking for more and more.

The order of battle for the tactical air program is such that the close support program will not work effectively unless the interdiction program is almost licked. If the men, arms, and equipment get to the front lines, then it takes much more air support to knock them out than if they were stopped by the interdiction program.

It would seem that if the overall tactical air program is going to work, the ground forces should give the Air Force more cooperation and less opposition. It all boils down to the basic idea of the unified services working toward the same goal and fighting the common enemy and not each other.

This all leads me to make one more statement. It seems to me that if the three-unified-services system is going to function efficiently, then the Army should control all ground forces, the Navy all naval forces, and the Air Force all air forces. This means the Marines should be under Army command; crash boats, transport ships, etc., should be under Navy command; and liaison, Fleet Air, etc., should be under Air Force command.

Of course this means working together and probably a slight dent in the pride of some people to start with, but in the long run a smoother operating, more efficient defense force. The sooner we adopt this system and iron out the minor difficulties the sooner we will have an adequate defense force.

Should you decide to publish this letter, please omit my name as I am presently a junior officer in the Pilot Training program.

NAME WITHHELD
1st Lt., USAF

Security & Confusion

Your Oct. 15 article on Security & Ultimate Confusion, is timely and I think should be well received. Most readers should be in accord with your editorial expression.

I read it upon returning from our annual Sigma Delta Chi Convention at Detroit. You will be interested in knowing that at this editor's convention, the speaker who received the greatest applause was Mr. Jones, who advocated the need for legislation to clarify the rights of the press in obtaining information the people are entitled to know. . . .

HARM WHITE, President
White Advertising Co.
Union Commerce Bldg.
Cleveland 14, Ohio

Air Taxi Publicity

I have just finished reading Air Traffic Conference Bulletin No. 252 which indicates two more members have dropped from the air taxi service agreement.

We are getting an increasing number of such letters of late and there must be a reason. I feel that the difficulty lies in the fact that the air taxi operators are not receiving requests for service from the certificated carriers.

And this is not due to the fact that there is not a call for the air taxi service. Reservations and ticket counter personnel of certificated carriers know little or nothing of the air taxi agreement and they are the ones who handle the passengers.

Recently I walked around Boston's Logan Airport, stopping to talk with several ticket agents, and not one knew how the air taxi system works or had made a recent reference to Table 1000 in the Guide.

On Table 1000 in the Guide the Cape Cod Flying Service has purchased a display area on Provincetown-Boston service in addition to the regular listings under the heading. We tell our passengers, whom we fly to Boston and put on certificated airlines to points beyond, that when they want to return they can make arrangements through the large carrier. We even tell them to mention Table 1000 to the reservations personnel.

Despite this, we repeatedly get long distance calls from our passengers asking us to meet them in Boston, adding that no one with the large airlines where they then happen to be can give them information on service or request space from Boston to Provincetown.

If the Air Taxi Conference is going to last it must be a two-way deal. Airlines must familiarize their personnel with the manner of air taxi operation and give it some publicity. Perhaps instructions on the top of Table 1000 in the Guide would be helpful in issuing exchange orders. If things keep on going as they are there will be more withdrawals.

JOHN C. VAN ARSDALE, Manager
Cape Cod Flying Service
Provincetown Municipal Airport
Provincetown, Mass.

Hall of Giants

We all were delighted with your excellent treatment of the Hall of Giants in the Dec. 3 issue of AVIATION WEEK.

Irving Stone's thorough reporting of the pre-production status of this new manufacturing facility has caused much favorable comment about your publication. . . .

RICHARD L. BEAN, Publicity Manager
Lockheed Aircraft Corp.
Burbank, Calif.

From Convair

Please give Lee Moore our warm congratulations on his article in AVIATION WEEK Dec. 10, on twin-engine transports. It is exceptionally well written and informative and should stimulate a lot of new thinking in the industry. . . .

NED ROOT,
Manager Public Relations
Consolidated Vultee Aircraft Corp.
San Diego, Calif.

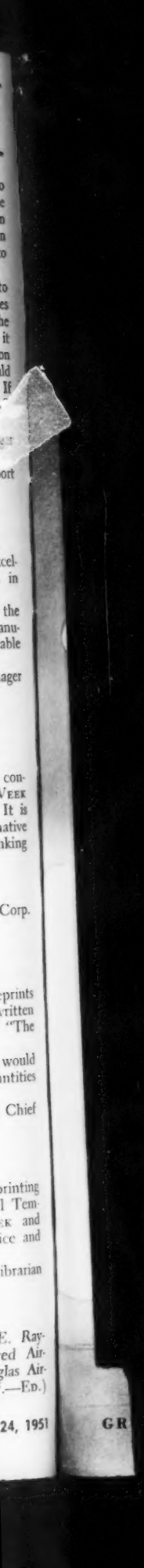
Reprints

We are interested in obtaining reprints of the complete series of articles written by Mr. Arthur E. Raymond entitled, "The Well-Tempered Aircraft."

If you are able to supply them, we would appreciate a price quotation on quantities up to 500 copies. . . .

J. F. SCHIRTZINGER, Asst. Chief Engineer
Convair
San Diego 12, Calif.

We have been noticing your printing of Arthur E. Raymond's "The Well Tempered Aircraft" in AVIATION WEEK and would like to inquire about the price and form of the complete report.

EVELYN CHENOWETH, Librarian
Boeing Airplane Co.
Wichita 1, Kan.

(All reprint orders for Arthur E. Raymond's article "The Well-Tempered Aircraft" should be addressed to Douglas Aircraft Co., Inc., Santa Monica, Calif.—ED.)